RAILROAD GAZETTE

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The Engineer and the National Society.*

The growth of our country in extent, numbers, wealth and comfort is more largely due to the civil engineer than to any other of her citizens. His work has made possible the occupation of the entire continent by cultivated and prosperous communities. Although the duties of the engineer in the complex society of the present day are in many respects different from those required when the country was younger, yet they bear a not lesss intimate and important relation to the public welfare. The new demand for the services of the civil engineer is due to the extension and greater complexity of the social organism, and requires for its supply more varied scientific knowledge. Its field includes the manufacture of power from new sources, and the contrivance of new tools for its utilization. . . . There is also an increasing demand for the expert administration and development of those departments of great corporations, already established, whether for civic or industrial purposes which require scientific knowledge, trained judgment, skill in detail, promptness in action and familiarity with responsibility. These qualities make up the equipment of the civil engineer, and, having been developed by designing and constructing such work, they fit him peculiarly for its maintenance and betterment. Many of the largest and best managed corporations have already placed their administrative and scientific departments in the hands of trained engineers, and are seeking the educated intelligence of graduates of engineering schools for practical positions in their operating departments.

If this estimate of what the civil engineer has already done and has still to do for the future development of this country is reasonable, such an occasion as the present is opportune for the consideration of the means by which our duties to ourselves and the public can be best performed, and wherein this can be promoted by an American society, where engineers from all parts of the Continent, engaged in any work requiring the scientific application of "the forces in Nature for the use and convenience of man," can meet on common ground and unite, as a body, in such measures as will most efficiently accomplish the objects they have in view.

The attempt has been made by some professions, which have had sincerely in view the public and private interest, to attain these objects, and, at the same time, defend themselves against the Bashibazouks of the calling, by protective legislation. I believe that the experience of the past, in this direction, has not been encouraging, for, on the one hand, the public is disposed to view any such measure with a suspicion and resentment which would be likely to thwart its benevolent intention, and, on the other, the advancement of science is no longer an infant industry, needing protection against the waning powers of ignorance and pretension. It will be more satisfactory, in the long run, if the struggle for existence is allowed to go on, the engineer acquiring his status by hard work, and the people their experience by hard knocks, in order that adjustment may be final and permanent. . . .

The same thought may be applied to what are called "codes of professional ethics." Of course, a strong and cultivated moral sense, of which the Golden Rule forms the larger part—absolute good faith and fidelity toward all men, and particularly among fellow-workmen—is the foundation of all social and professional relations, being, perhaps, stronger and more necessary among engineers, in proportion as their responsibilities to the public and to each other are greater than in some other vocations. But this must be a plant of natural growth, with roots deep in the moral nature, made strong and hardy by exposure to the vicissitudes of life, and kept green by professional good-fellowship. A code which has to be proposed, and seconded, and debated, and amended, and passed by a majority vote, can hardly be counted on for the necessary virility in the time of trial. . . .

In an art the individual is everything, and the results are not cumulative. The high-water mark of the arts has not been raised for centuries. Its great achievements preserve their relative greatness forever. Its leaders have not made it easier to write or paint or carve, nor, I am sorry to add, have great orators made it easier to deliver an annual address. This is not the condition or limitation of an applied science, which is helpful, and whose results accumulate. Every good piece of original engineering work not only helps the world to live in greater comfort and security, but enables many engineers to do as well and some to do better. The test of its worth is its absorption into the general body of engineering practice for the use of all men. At first a capstone, it afterward assumes its orderly and honorable place in the foundations. Those who follow art must all start from the same datum plane, and the point they reach is limited by the span of human life; but engineers may begin where their predecessors left off, and each in his day may share the advantage of the dwarf in the proverb, who, mounted on a giant's shoulder, sees farther than the giant. . . .

Since organized co-operation among the members of a profession affords a stimulus for interest, and an opportunity for the increase and systematization of learning, which is essential for the freest development of the applied sciences, this century, in which the progress of the learning on which these sciences is founded, and the increase of the uses to which they are applied, has been unprecedented in the history of the world, has therefore been specially marked by the birth and growth of scientific societies of all kinds. It was but natural that civil engineers should take a very prominent part in this movement, impelled by the necessity for a more complete organization of their department of knowledge and the desire for a common ground on which to meet to compare results and collect information for future generalization, and establish kindly personal and professional relations. . . . Hence, engineering societies, supplying a want otherwise unsatisfied, are numerous and prosperous, and the good civil engineer is apt to be a good society man.

As the growth of physical science, of the knowledge of the forces in nature, of their laws and methods of application to the demands of the complex civilization of to-day, has been abnormally rapid in this age, that tendency toward specialization, which is more or less observable in all lines of life, has had an unusually marked effect on our profession. The never-ending examination, which we call the struggle for existence, is assigning, or seeks to assign, each of us to the special work for which he is best fitted. In the primitive days of the world, the wants of a man and his family were so few and simple that he could supply them all himself, courting his wife with a club or lariat, building his shelter, making his clothing, and digging or killing his food. With the increase of personal wants commenced the division of labor. So, in the earlier days of the profession, the demands of the public from engineers were so few and progress was so slow, that a complete knowledge of the arts required to supply them was within the reach of a man of good mechical ability, combined with the other qualities which make for success in life. But the men of universal knowledge and achievements, are figures of the past, and that learning and education which was once called liberal because it was free from limitations, and could range all over the then known world, is now but a tradition. This is the sufficient reason for the existence and prosperity of numerous societies dedicated to the study and practice of some special department of engineering science. They are obviously the result of natural and healthy growth, a part of the process of differentiation from the simple to the complex, under the laws of evolutionary progress, that they constitute an important factor in the intellectual and educational influences of the profession.

But there is another plane of cleavage along which American engineers divide. The distances across our country are magnificent, and we, in large proportion, are stationed at the outposts, . . . which has led to an increase in the number and prosperity of local societies which substantially promotes the growth of scientific knowledge, interest and good fellowship.

This specialization of work and interests which has led to the sub-division of the profession on topical and local lines must, therefore, not only be accepted as part of the natural trend of events, but also acknowledged as an important factor in engineering progress. But it surely involves a tendency toward partial development, and, to that extent, is accompanied by serious peril of atrophy or degeneracy. It might appear, at first sight, that the greatness of both the country and of the profession were obstacles to the adequate development of a national society. On the contrary, the conditions which I have recited are both reasons and incentives for averting this peril by an organization whose chief function is the maintenance of the unity and dignity of the profession by the advancement of that general engineering knowledge upon which the successful practice of all its branches is conditioned, and by strengthening the ties of fellowship among American engineers. . . . A national society is not only apart, but the head and front of a great system, founded on the necessity for general scientific culture and the fellowship of American civil engineers. It bears the relation to other societies that a university does to a college. It should supplement and round out the work of those societies which specially pursue one branch of learning and practice, by making its prominent function the presentation and illustration of the general truth of engineering science, which is the root and trunk from which all the branches spring.

It represents the Federal idea, and should lead the special and local societies, not only to closer union among themselves, but also with a central institution, with the bond of a common object, of a love for all knowledge which is included in the constantly broadening definition of civil engineering, and of kindly professional feeling and intercourse. Our ranks are full of the distinguished members of the special and local societies, and, in turn, they have many members who should belong to us, from their eminence and learning, men who do not confine their interest and work to one department of the profession or to the material progress of one part of our common country. It is not too much to say that the prosperity of our society is closely interwoven with theirs, as the product of the same social and professional instincts. . . .

It is true that the idea of professional and social organization can only attain its full development in a national society, and only then provided its membership is large and represents the highest grade of attainments, its *Transactions* of wide range and high merit, its library comprehensive and accessible, and its home attractive. . . .

But the expediency of steadily raising the standard of membership is so obvious that it is hardly a subject for discussion. It is rather a part of the general movement of the times for the advancement of learning. On the one hand the preparation for practice is becoming more difficult, from the increase of knowledge, and the duties more exacting from the enlargement of the field of civil engineering work and the variety and magnitude of its problems. On the other hand, the professional schools are, year by year, sending out men better equipped and trained for work. So the forces are applied from different directions and determine the path this society must follow, if for no higher reason, to keep in touch with the times. . . .

Since the prosperity of the society is so entirely dependent upon the character of its members, it is important that the machinery of election should be of the most perfect kind. With this object, I believe that certain changes in that part of our constitution regulating elections, which are in the line of the experience of other large associations for social, business or scientific purposes should receive consideration. The present system of proposal and investigation, the Membership Committee and the Blue List, is entirely good. But, after them, it remains in the power of those who have not seen fit to express any objections they may have, on the opportunity afforded by the Blue List, or of those whose reasons may not have appeared sufficient to the Board of Direction to render a verdict of such importance that a prudent man may well hesitate before he accepts the risk, no matter how well he may be qualified. A more serious view is that the present method may occasionally admit of the infliction of wrong or injustice. I believe, for these reasons, that the responsibility of final election could be entrusted to the Board of Direction with benefit to the society.

The chief function of an engineering society is the preparation, discussion and publication of professional papers. They constitute the reason for its existence and its claims to consideration. With us, they fill the place of the annual reports of decisions with lawyers, with the advantage that, if we do not like the precedents they establish, we are at liberty to improve them. . . .

The *Transactions* of the American Society of Civil Engineers are the record of the history of American engineering, and in its list of contributors are the names of those men who have made this history. These volumes are the foundation on which the high character of the society rests, and by their increase in number and value will the progress of engineering learning and the welfare of the profession be best assured. The importance of this part of the work of the society imposes a duty on every member, while he is afforded the privilege of access to an audience which he can reach in no other way than by its discharge. The appeal is thus to professional pride and self-interest, and to loyalty to the society and his fellow-members.

The occupation of the New Society House will give opportunity for the development of the library both in extent and usefulness. The proposed arrangements for stacking and reading are excellent. Whether the library is hereafter to be open to the public, to all seeking information on engineering topics, or is to be a private storehouse for such knowledge, is a subject which seems to me deserving of very serious consideration. . . .

Among the benefits of membership should be the opportunity of conveniently and cheaply securing, by correspondence, an abstract or summary of engineering literature on any point or subject, so far as it may be contained in our library. I believe that this system would meet a reasonable want of many members, for engineers generally have not the constant opportunity of collecting or consulting books that belongs to more sedentary professions. This system would involve an expense for which, at present, the society may not be prepared, and at the beginning sufficient fees to cover the cost of the

*Extracts from the address at the Annual Convention at the Chateau Frontenac, Quebec, June 30th, 1897. By Benjamin Morgan Harrod, President Am. Soc. C. E. The title is supplied by the editor of the *Railroad Gazette*.

service might be required. But as the system and the society prospered, the application of a part of its revenues to the reduction of these fees would be a proper and legitimate expenditure for the promotion of the main object of the society, the increase of engineering knowledge among its members.

It would also be a proper subject for consideration, and perhaps of experiment, to ascertain if a system of loaning books to members, under certain restrictions, secured by deposit, or otherwise, could not be devised, with a gain to learning more than commensurate with any loss or trouble that might be incurred.

The Central London Contract.

The entire electrical equipment of the Central London Railway (Underground) will be American. With the exception of the elevators the contract has been taken by the British Thomson-Houston Co. (Ltd.), representing the General Electric Co., while the elevator contract has been taken by Mr. Frank J Sprague. The financial and parliamentary history of this undertaking, the route and the system of building and working in general were very fully described in an article (with map and sections) which we published Nov. 20, 1896, and which was prepared especially for us by Mr Grinling. In what follows we shall not repeat more than seems absolutely necessary of that article, to which the reader is advised to turn.

The railroad is 6¼ miles long, from Shepard's Bush to Liverpool street station. In building, vertical shafts were sunk at six different points to between 60 ft. and 70 ft., and the tunneling was begun in four tunnels at once, two in each direction, from each shaft. At each of the 14 stations were driven two shafts 23 ft. in diameter, and 87 ft. deep and one 18 ft. in diameter and 76 ft. deep, the two former containing two ingress and two exit elevators and the smaller two spiral stairways. The shafts are lined with cast-iron plates 1⅛ in. thick and 4¼ in. in the flanges. All voids back of the plates are filled with hydraulic lime grout injected under pressure. The glazed white brick passages leading from the bottom of the shafts to the stations are 8 ft. 3 in. wide on the entrance side. On the exit side, where crowds might collect in front of the elevators, they are 13 ft. wide.

At the stations the widened tunnel is 21 ft. in diameter and 375 ft. long. The main tunnels are each 11 ft. 6 in. in diameter. The plates used to line these tunnels are ⅜ in. thick, with flanges 4 in. deep. The shield for driving the small tunnels was 12 ft. 8 in. in diameter and was pushed forward by six hydraulic rams giving a pressure of 239 tons. For driving the station tunnels the shield was 23 ft. 8 in. in diameter and was pushed forward by 22 rams, giving a pressure of 840 tons.

The rails weigh 100 lbs. to the yard and are laid on cross-ties. The system of contact will be the third rail, with the contact rail between the service rails and insulated. The conductors will be fed at intervals from a copper feeder cable. This feeding will be controlled from the signal boxes and the operator will be able to cut out any section of the line when necessary. Instead of motor cars, locomotives similar in appearance to those used on the Belt Line tunnel service of the Baltimore & Ohio will be used to haul the trains. The reason for this lies in the fact that the tunnel is only 11½ ft. in diameter and that the bottom of the tunnel must accommodate the road bed. This materially reduces the clearance. The motors require to be suspended between 30-in. wheels, at least, to give the necessary clearance between them and the ground and this fact has brought about the locomotive in place of the passenger motor car.

On each side of each station is a three per cent. grade, which helps in stopping and starting. The saving in power necessary to secure the requisite rapid acceleration is by the adoption of this plan, calculated to amount to about 33 per cent.

The schedule speed will be 14½ miles an hour, with stops at each station of 20 seconds. The trains will be run at first under a headway of two and a half minutes.

The generating station will be in the open air at the extreme western end of the line, near Shepard's Bush station. Steam will be supplied from Babcock & Wilcox boilers, and the engines, of which there will be six, will be horizontal Allis machines, each of 1,300 H. P. The electrical system adopted is the three phase alternating high-voltage primary, with reducing transformers and rotary converters, similar in general principle to that installed by the General Electric Co. for the roads between Lowell, Mass., and Nashua, N. H., and at Portland, Or.; between Niagara Falls and Buffalo, and on the line between Dublin and Dalkey, in Ireland.

The dynamos, of which there will be six, will each be directly driven by its own engine. These dynamos are of the newly developed rotating field and stationary armature type. Each will have a capacity of 850 KW. The speed of revolution will be 94, the frequency 25 cycles, and the initial voltage 5,000 volts. The total capacity of the power station will be 5,100 KW., or 6,300 H. P.

From the switchboard the current is carried to the convertor sub-stations, of which there are four. Two of these will cointain seven step down static transformers, six for service and one in reserve, each of 300 KW. capacity, and two rotary convertors, each of 900 KW. capacity. The other two stations will contain four 300-KW. static transformers and one 900-KW. rotary convertor. In the transformers the voltage of the current will be reduced from 5,000 volts to 330 volts alternating-at which pressure it will enter the alternating side of the rotary convertors, issuing from the commutator side direct railway current at 500 volts. The spare transformers mentioned above will be put into service when the headway of the trains is reduced. The static transformers are of the air-blast type, the windings being cooled by air forced through them by a blower. The rotary convertors will be similar in construction to those used at Niagara, Buffalo and Nashua.

The use of the sub-station method of electrical distribution ensures a uniform pressure throughout the entire length of the line. Fluctuation, therefore, which would materially interfere with the lighting of the station and trains, is reduced to a minimum. The limit of variation fixed by the Board of Trade, to the rules of which department all electrical installations in Great Britain must accord, is 10 volts. With the method adopted in this installation, the variation in pressure will not exceed three volts.

The locomotives will number 35. Each will consist of a sheet iron cab containing the controller, indicating instruments, air-brake, pump and controller, sand boxes, etc., mounted upon a locomotive truck. The motors have been especially designed for this work. They are of the gearless type and according to the new system of motor nomenclature adopted by the General Electric Co., are known as the G. E. 56. Four of these motors will be mounted on each locomotive, one to each axle, the total drawbar pull being 14,000 lbs. The controllers will be of the series parallel type arranged for four motors. Each controller will embody the magnetic blow-out principle.

The weight of each locomotive complete will be 35 tons of 2,240 lbs. The trains will be made up of seven cars, weighing when loaded 105 tons additional, giving a total train weight of 140 long tons. The seating capacity is calculated at 336 persons.

Access to and exit from the stations will be by powerful high-speed elevators. These will be built by the Sprague Electric Elevator Co., of New York. The elevators will be 49 in number; each will have a capacity of 15,000 lbs., or about 100 passengers per trip. The speed will be about 150 ft. per minute. These elevators will be of the double drum type similar to those built for the War Department at Washington, but of much higher carrying capacity.

It is estimated that the number of passengers which this road will carry per annum is 43,000,000, at an average fare of four cents.

The Boston Elevated Railroad.

To the casual observer, who reads or hears from time to time of the steps taken within recent years by the city of Boston for the improvement of its transportation facilities—now a tunnel, now a bridge, now a street-widening and now a railroad station—these steps have no very obvious connection with each other or with a comprehensive scheme for surmounting the great topographical difficulties bequeathed to the inhabitants by nature and by their ancestors. Indeed, there are comparatively few, even of the citizens, who realize that there is any such connection, and hence it is that the subway and elevated railroad have been made to masquerade as opponents of each other, dividing the citizens into factions advocating one or other method of solving the rapid transit problem; so that the victory of the subway has meant until very recently the defeat of the elevated railroad.

But to those who remember the exhaustive investigation of the rapid transit problem made by the Commission appointed in 1891, and the conclusions arrived at in their thorough-going report, it will appear that all the later steps have been close along the line of their recommendations, and that according to those recommendations, the subway and elevated road form necessary complements of each other, the former being intended to take the place of the latter in that portion of the city marked off by the Commission as the congested district, where the streets were too narrow and the land to valuable to permit overhead obstruction, and the elevated road to supplement the subway in parts where the cost of the latter, if nothing else, would have made it out of the question.

It may be said to be without this deliberate intention, however, that the subway was built; for the original law providing for it (1893) intended it to accommodate the surface tracks only; and though the combination law of the following year, which was accepted by the city in a special election held July 24, 1894, provided for an elevated railroad* *and* a subway, these were not intended to have any connection with each other, but to be parallel routes competing with one another. This bill, in fact, was virtually two separate bills connected with each other only by legal form. The first twenty-two sections of it related solely to the incorporation and functions of the Boston Elevated Railway Company. The remaining seventeen sections related solely to the establishment of the Boston Transit Commission for the purpose of constructing a subway. Such a combination was made necessary by the legislative exigencies which required the conciliation of both sides in order to pass any bill on the subject; but the same thing almost caused it to be rejected by the citizens.

As we surmised at the time*, however, the elevated railroad franchise thus obtained was got without *bona fide* intention of building: or at any rate, the plans proposed were too impractical, the necessary outlay of too doubtful magnitude, or the probable competition from the subway system too great to attract the necessary capital. Nothing, therefore, came of it as it was. It is not difficult to see, however, that the subway only partly solves the rapid transit problem in Boston. Extending, as it does throughout the congested district, as defined by the Rapid Transit Commission of 1891, it will relieve the congestion; but outside of this district travel will be no more rapid than before.

The franchise of 1894, though unfit to be acted on without modification, could not be overlooked by investing capital. But since its own schemes for an elevated road were abandoned, the greatest opponent of the elevated road has been the West End Street Railway, which outside of the steam roads has had practically a monopoly of the city and suburban traffic. As, however, it became evident that an elevated railroad was merely a question of a short time, and that it was wisdom on the part of the West End Company to be beforehand in the matter (at least one powerful western capitalist was reaching out his hands for the franchise), some of the large shareholders, including the banking firm of Kidder, Peabody & Co., got together about a year ago and formed a new company, which bought up the old franchise for the sum of $400,000, half in cash and the balance to be paid when the new road was started.

It will therefore be understood that the forces at work during the past twelvemonth, which have just resulted in a new and thoroughly renovated franchise, have not been really in opposition to the West End road, but a portion of its own stockholders trying to convince the others that it was the part of discretion to embrace instead of opposing the elevated scheme. The new company, however, under the lead of Col. Wm. A Gaston, without waiting until matters were arranged with the West End Company, early in February last† introduced its new franchise, equal in length and importance to that of 1894. It had a hard fight in the legislature, there being a number of opposition bills for elevated railroads, besides the strong party opposed to all elevated roads. It has at length been passed, however, and was approved by the Governor on June 10. We give below some of the most important features.

(1) Motive power, "electricity or other motive power except steam."

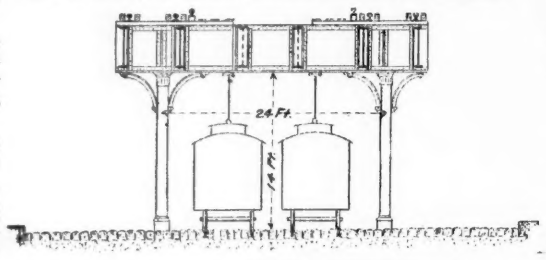
(3.) Fare five cents with free transfers between the elevated and surface cars. This fare may not be reduced by law for 25 years; but in case the entire net income of the company after paying all fixed and other charges exceeds eight per cent. of the paid-up capital stock, the Board of Railroad Commissioners may, on petition of the Board or Aldermen, Selectmen, or 50 legal voters of any city or town containing part of the company's road, reduce the fare by an amount such as to leave the company's income not less than the said eight per cent.

(5.) For the 25 years of the franchise, the regular taxes at present imposed on street railroads shall be imposed on the lines of the company, and in addition the special tax of ¾ per cent. of the gross earnings, *plus* a sum equal to the excess of the annual dividends over 6 per cent. No other taxes may be imposed.

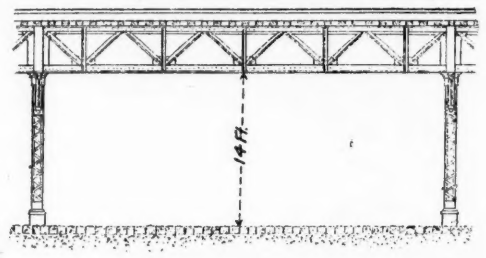
(9.) The Atlantic avenue branch, connecting the north and south terminal stations of the steam roads, may be used to carry steam passenger and freight cars between these stations. If this is done it may be found possible to dispense with the Union Freight line now occupying the surface of the same streets.

(10) The company is authorized "to lease and operate the lines, property, rights, locations and franchises of the West End Street Railway Company," and of any other street or elevated railroad tributary to it.

(11.) Provision is made for the use of the subway by the elevated railroad company, under agreement with the West End Company, for alteration of the same by the Boston Transit Commission, necessary for running the elevated cars through it, and for large and important additions to the present subway, as follows: From Scollay square, at the request of the company, the subway is to be extended through Court street and Cambridge street to North Russell street (or further, even to the Charles River, if the Boston Transit Commission shall think expedient), where an open incline is to be constructed to connect with the elevated structure, the street at the same point being widened so as to be 30 ft.



Section of Proposed Boston Elevated.



Elevation of Proposed Boston Elevated Road.

* We should have said, *two* elevated railroads; for besides to be built by private capital, the act provided also for a separate line paralleling the first, to be built by the city in connection with the subway, over land bought for the purpose, from its southern extremity to Franklin Park.

*See *Railroad Gazette* for Aug. 24 (2), 1894.
†See *Railroad Gazette*, Feb. 19, 1897, p. 136.

wide on each side of the tracks. A similar incline is to be built at Causeway street, and, presumably, also, at the southern end of the subway. The new Charlestown Bridge across the Charles River, now under construction (to replace the old Charles River Bridge), is to be made of sufficient strength to support the elevated structure, the additional cost incurred being paid by the company.

(12.) Within two years, the company must join with the cities of Boston and Cambridge in a petition to the Legislature for a new bridge across the Charles River, on the site of the West Boston bridge, suitable for elevated and surface cars: the added expence necessary for the elevated structure being paid by the company, and the remaining half by each of the two cities. Within six months of its completion the company must apply for a route over said bridge to Brattle Square in Cambridge, which line must be built within two years after it is authorized to be begun.

(13.—A provision added by the legislature.) The long-projected East Boston tunnel must, according to the act, be begun as soon as the first construction of the elevated road is authorized. It may be a single or double tube, for two tracks, and is to extend from Hanover street, in Boston, to Maverick Square, East Boston, where connection with the surface tracks may be made. As it is to have a "suitable connection with the subway" on the Boston side, and is to be used by the cars of the elevated railroad company, it may be considered altogether probable that the subway will be extended from Washington street right through Hanover to the tunnel, instead of having one or two inclines on Hanover street to connect with the surface. It will thus (but not otherwise) be possible to run trains between East Boston and any other point reached by the subway and elevated lines. On completion of the tunnel it is to be leased to the company for a term to expire with the franchise, at a rental equal to ⅜ per cent. of the gross receipts of all lines owned, leased or operated by the company, with privilege to sublet, and such other arrangements as may be made by the contracting parties or determined by the Railroad Commissioners. Also a toll of one cent per head is to be established, which may, however, be reduced when the receipts therefrom and from the rental exceed the interest and sinking-fund requirements for the tunnel.

(14.) To meet the expense of the tunnel and additions and alterations of the subway, the city is authorized to issue 40-year bonds bearing not more than four per cent. interest, in the amount of $500,000 on account of the tunnel, and whatever other amount may be necessary to pay for the subway additions and alterations; these bonds not to be included in determining the limit of indebtedness of the city. The income from the rental and tolls of the tunnel, and if they are insufficient, that from the taxes of the railroad company, are to be used for the payment of interest and sinking-fund requirements.

We have, then, provided for in this act, besides a new bridge, a new tunnel, and extensive additions to the present subway, a complete and definite system of elevated roads running out in all directions in the suburbs; working harmoniously with the surface cars and in the use of the subway; connecting the two great terminal stations of the steam roads, and possibly doing away altogether with the transfer of freight cars through the streets of Boston; and last, but by no means least, what will be the most extensive system of transportation on a single five-cent rate that the world has yet seen. Passengers will be able, under this system, to travel from City Point in South Boston to Newton, or from Forest Hills to Malden, distances of over ten miles, and even from Dorchester to Arlington Heights, 13½ miles, for a single fare of five cents; or, in general, between any two points within a radius of five miles from Boston. This supposes the leasing merely of the West End lines; if others, such as the Lynn & Boston, are also leased by the company, of course the limits of the five-cent fare may be extended much further.

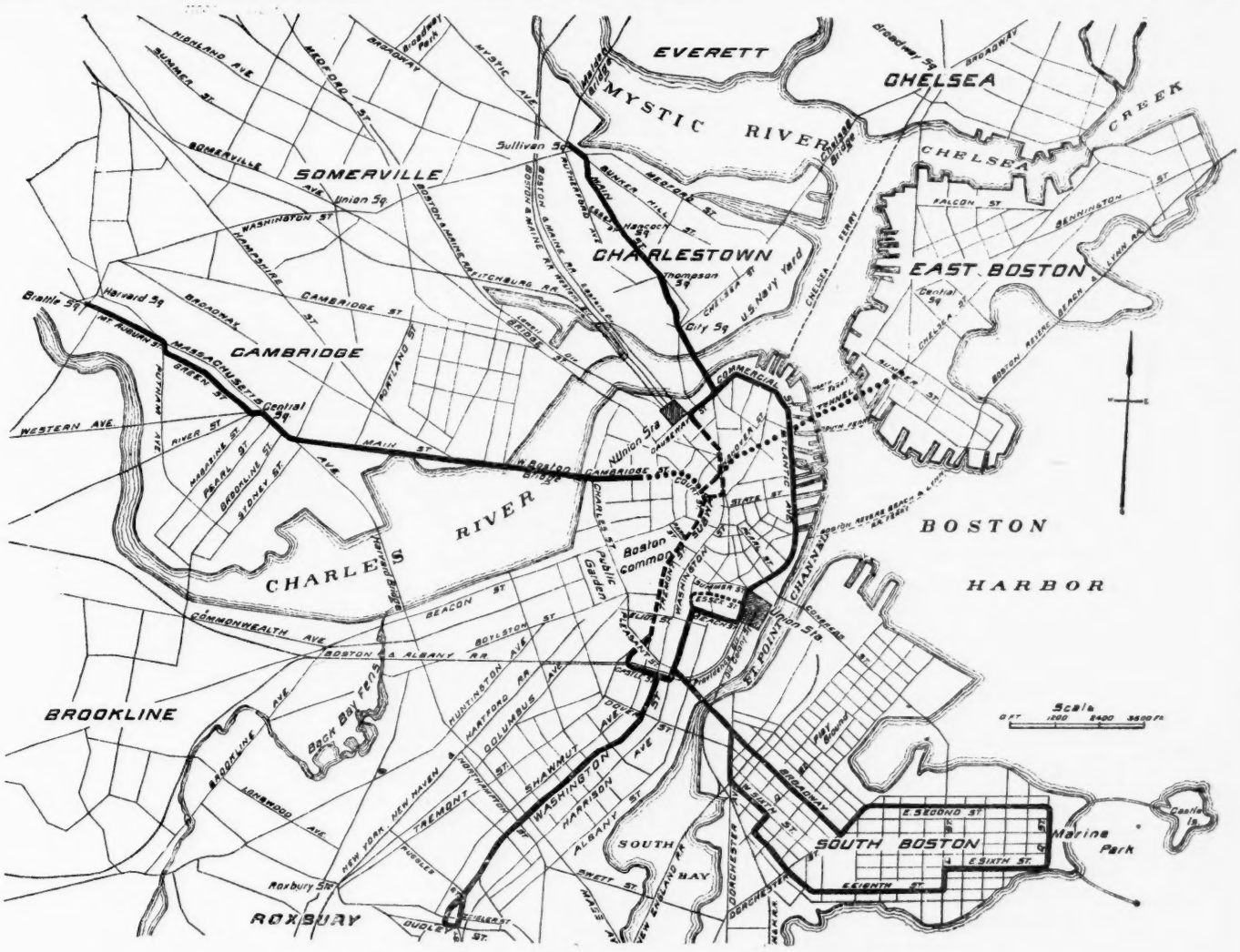
Further, a new Broadway bridge over Fort Point channel, not provided for in the act, but mentioned in connection with the South Boston route, may be considered a necessity of the near future, the old bridge on the site of the proposed elevated railway crossing being unfit for the purpose. This, with the Charlestown bridge, now under construction, and the new West Boston bridge provided for in this act, makes three new bridges to be completed within the next few years, all forming a part of the rapid-transit scheme.

As regards routes and lines to be built, it may be said that while the original franchise provided for an immense ramification extending from end to end of the Metropolitan District (a circle of 10-mile radius from the Boston City Hall), and while these routes are still open to the present company, the latter will for the present confine itself to those routes shown by the heavy lines on the accompanying map. The first route built will be that between Roxbury and Charlestown, passing through the length of the subway.

The arrangements to be made with the surface cars do not contemplate (although the franchise authorizes it) any transfer of cars from the surface to the elevated tracks. None of the surface cars will pass completely through the subway, the two-track portion, except the Boylston street branch and the Hanover street-Scollay Square loop, being used exclusively for the elevated cars.

Concerning construction nothing has been done, the whole energy of the company having been thus far devoted to the passage of the bill. We show, however, the general scheme which will be adopted, that of a double-post structure to carry two tracks and allow for a third.

The principal and most important present task of the company, however, is that of securing absolute control of the West End Street Railway Company. That has not yet been satisfactorily arranged, but there has been an amicable understanding from the beginning, and a settlement will no doubt be arrived at soon. The authorized capital stock of the company is not less than 10 nor more than 20 million dollars. Its officers are: Wm. A. Gaston, President; Wm. A. Bancroft, Vice-President. Directors: Eben D. Jordan, Francis H. Peabody, T. Jefferson Coolidge, Jr., Chas. J. Paine, Samuel Carr, Frederick Ayer, Wm. Endicott, Jr., Robt. Winsor, Jacob C. Rodgers, J. M. Prendergast. The present Chief Engineer is Mr. Geo. S. Rice, who was also Chief Engineer to the Rapid Transit Commission of 1891-92. Mr. George A. Kimball has been Engineer of the company in the work connected with securing amendments to the charter.


EVERETT
MYSTIC RIVER
CHELSEA
CHELSEA CREEK
SOMERVILLE
CHARLESTOWN
EAST BOSTON
CAMBRIDGE
CHARLES RIVER
BOSTON HARBOR
BROOKLINE
ROXBURY
SOUTH BOSTON
SOUTH BAY
Broadway Park
Broadway Sq.
Sullivan Sq.
Union Sq.
Thompson Sq.
City Sq.
U.S. Navy Yard
Central Sq.
Harvard Sq.
Brattle Sq.
Kendall Sq.
Lechmere Point
Boston Common
Public Garden
St. Botolph
St. Paul
St. Francis de Sales
Castle Is.
Marine Park
Rosbury Sq.
Scale
Highland Ave.
Medford St.
Mystic Ave.
Somerville Ave.
Washington St.
Hampshire St.
Cambridge St.
Broadway
Massachusetts Central
Western Ave.
River St.
Main St.
Green St.
Portland St.
Beacon St.
Commonwealth Ave.
Boylston St.
Tremont St.
Columbus Ave.
Shawmut Ave.
Washington St.
Harrison Ave.
Albany St.
Dudley St.
Longwood Ave.
Brookline Ave.
Sidney St.
Pearl St.
Hampden St.
Bickler St.
Sweet St.
Dorchester Ave.
Eighth St.
E. Second St.
E. Sixth St.
Falcon St.
Bennington St.
Lynn Beach
Commercial St.
Atlantic Ave.
Causeway St.
Charles St.
Beverly St.
Slate St.
Washington St.
Summer St.
Chelsea St.
Sumner St.
Meridian St.
Maverick Sq.
Boston & Albany R.R.
Boston & Maine R.R.
Fitchburg R.R.
Old Colony R.R.
New York, New Haven & Hartford R.R.
New England R.R.
Boston & Maine R.R. Eastern Div.
Boston & Maine R.R. Lowell Div.
Boston & Maine R.R. Fitchburg Div.
Boston & Maine R.R. Western Div.
Boston & Maine R.R. Old Colony Div.
Boston & Maine R.R. New York Div.
Boston & Maine R.R. Boston & Albany Div.
Boston & Maine R.R. Boston & Maine

span will be 400 ft. long and 115 ft. wide with four main trusses. Between each pair of trusses two tracks will be carried, while on either side outside the trusses single tracks will be carried on cantilever extension of the floor beams. The approximate weight of the steel required for this bridge is 3,250 tons beside 550 tons of timber.

It was originally thought by the engineers of the Sanitary District that to put in movable bridges at this time would require an additional outlay of several million dollars, but a careful estimate showed that taking everything into consideration, namely, first cost, cost of maintenance and operation, interest on the capital invested, etc., the cost of swing bridges would not exceed that of fixed bridges. The cost of other types of movable bridges for these points was thought to be more than that of swing bridges. At present the machinery will not be installed, as the bridges will not have to be operated until the channel is used as a ship canal, but the plans of all machinery and interlocking signals are now being made and the details worked out.

The Train Dispatchers' Convention.

The annual meeting of the Train Dispatchers' Association of America was held at Detroit, June 22. Mr. H. A. Dalby, of the Executive Committee, presided, both the President and the Vice-President being absent.

Mayor W. C. Mayberry delivered an address of welcome and was responded to by Mr. Dalby. The President's annual address was read by the Secretary. It deplored the heavy indebtedness of the association, a legacy from the unfortunate year 1892, and urged the adoption of measures for its removal: congratulated the association on having regained the respect of the railroad world, and made a number of recommendations for the good of the association.

The report of the Executive Committee, accompanied by that of the Secretary and Treasurer, was read and showed that the membership was substantially the same as during the previous year, numbering 414, gains having offset losses, but that there was a falling off in both receipts and expenditures, with a slight increase in the debt.

The committee also submitted a letter from the Secretary of the American Railway Association stating that the Train Rules Committee of that association is engaged in revising the standard code of rules, and that when the rules for the movement of trains by telegraphic orders are reached, the committee will be glad to receive from the Dispatchers' Association its criticisms upon the past working of the code rules and suggestions as to their improvement or amendment, and also as to additional forms of orders thought advisable. The committee recommended that the letter be referred to the Train Rules Committee with instructions to speedily act upon it and report to the Executive Committee its conclusions.

Fourteen applications for membership and reinstatement were approved.

The evening session of Tuesday was devoted to the reading of papers; one on "The 19 Form of Order," by Mr. F. Patterson (A., T. & S. F.), favoring, and one by Mr. F. M. Benning (C., R. I. & P.) opposed, the 19 Form. As this question is an open one, the discussion that followed was very animated and interesting. Mr. Patterson holds that time can be saved in getting fast freight trains over the road by using "19" orders. A paper on the subject "Is it Desirable or Safe to Permit Extra Trains to Pass Regular Trains Trains Without Orders?" by Mr. F. M. Benning, provoked much discussion, and it developed that the practice was very common on Western lines and had not proved unsafe, while it had greatly facilitated train movement and reduced the work of dispatchers. A paper on "The Advantages of the 24-hour Time Notation," was read by Mr. A. Wilcox, Chief Dispatcher of the Canadian Pacific, at Moose Jaw, Assiniboia, and was listened to with much interest. Mr. Wilcox asserted that this method had proved its usefulness on the Canadian Pacific, and that no employee would willingly return to the a. m. and p. m. divisions of the day.

A paper was read by Mr. H. A. Dalby on the "Duties and Discretionary Powers of the Train Dispatcher." This was published in the *Railroad Gazette* last week. It was warmly applauded.

An excursion by steamboat from Detroit to Port Huron, with an inspection of the Grand Trunk tunnel under the St. Clair River, and a return by train on the Grand Trunk occupied all of Wednesday forenoon and afternoon, and an evening session completed the work of the convention. The next meeting will be at Montreal, June 14, 1898.

The officers for the ensuing year are: H. B. Ware, B. & M. R., Wymore, Neb., President; F. M. Shultz, G. R. & I., Grand Rapids, Mich., Vice-President; J. F. Makie, C., R. I. & P., Chicago, Secretary.

The meeting throughout was characterized by much enthusiasm and unity of feeling. A subscription was started for the removal of the debt of the association and over $150 was pledged to that end by members present.

New Ten-Wheel Passenger Locomotive—Louisville Division, Illinois Central.

The engravings show one of six 10-wheel passenger locomotives built by the Rogers Locomotive Company for use on the Louisville Division of the Illinois Central, between Memphis and Louisville. These engines were designed by Mr. William Renshaw, Superintendent of Machinery, and are a modification of a class of 10-wheel engines used by the Chesapeake, Ohio & Southwestern before this line became a part of the Illinois Central. As these locomotives are in service on a road having many heavy grades and sharp curves they are necessarily heavy and powerful. Figs. 1 and 2 show the elevation of the engine, Fig. 2 being the erecting car, while Fig. 3 shows the sections.

The cylinders are 19½ in. in diameter by 26 in. stroke; the total weight in working order is 144,500 lbs., of which 109,000 lbs. are on the drivers. The driving wheels are of cast steel 69 in. in diameter. The boiler is of the Belpaire type, built of $\frac{9}{16}$-in. and ⅝-in. carbon steel plates, carries a working steam pressure of 180 lbs. per square inch, and is 66 in. in diameter at the front end. The total heating surface is 2,031.7 sq. ft.; that of the tubes is 1,854·6 sq. ft. The area of the grate is 28.01 sq. ft. Magnesia boiler covering is used. The firebox is of carbon steel, 10 ft. $2\frac{11}{16}$ in. long, 2 ft. 8⅝ in. wide, 6 ft. 1¼ in. deep at the front and 5 ft. 3¼ in. at the back and has a brick arch and cast-iron rocking finger grate.

The tender has two four-wheel swivel trucks and a wood underframe. The tank is made of ¼-in. steel plates, and has a capacity for 4,200 gallons of water and 6 tons of coal. The engine truck wheels are of the Paige spoke pattern and the tender wheels the Paige plate pattern. As will be seen from Fig. 3, there are two injectors, one No. 9 Monitor and one No. 8 Ohio, made by the Nathan Manufacturing Co. and the Ohio Injector Co. respectively; both injectors are on the right hand side of the boiler. The lubricator, also furnished by the Nathan Manufacturing Co., is placed within easy reach of the engineer; the air gage is also on the right hand side.

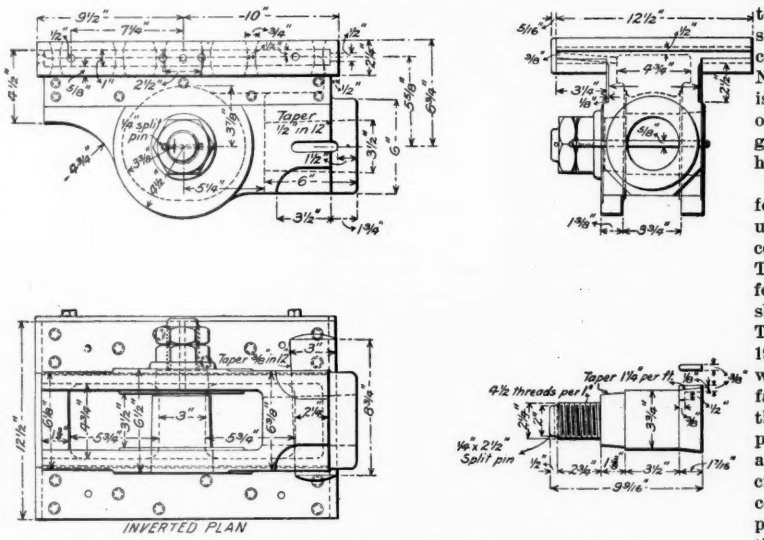


Fig. 4.—Crossheads of Rogers Locomotive for the Illinois Central.

The only important details for which cast steel has been used are the driving-wheel centers and the cross-heads. The crossheads are designed for a three-bar guide and are shown in detail in Fig. 4. The upper bearing surface is 19⅛ in. long by 12⅛ in. wide, while the lower bearing surfaces are each 3¼ in. wide; these are formed of brass pieces ⅝ in. thick, with gibs at either end, joined to the crosshead proper by ½-in. countersunk rivets. The piston rod where it enters the crosshead is tapered ¼ in. in 12 in., and is fastened by a key. The crosshead pin is 3¾ in. in diameter where joined to the connecting rod, and is held in place by two nuts and a split pin ¼ in. × 2½ in.

The driving wheel centers and crossheads were furnished by the American Steel Co., the tires are Krupp crucible steel. The Crosby Steam Gage & Valve Co. furnished the safety valve, the Ashton Valve Co. the muffler and steam gages, the American Brake Co. the driver and the Westinghouse Air Brake Co. the tender brake equipment and air pumps; the A. French Spring Co. the engine truck, driver and tender springs and the U. S. Metallic Packing Co. the valve and piston rod packing.

The engines have now been in service for the past three or four months and have worked very satisfactorily. The principal dimensions are as follows:

General Description.

Type	Ten Wheeled Passenger
Gage	4 ft. 8½ in.
Simple or compound	Simple
Kind of fuel	Bituminous coal
Weight on drivers	109,000 lbs.
" " truck wheels	35,500 lbs.
" total	144,500 lbs.

Dimensions.

Wheel base, total, of engine	24 ft. 3½ in.
Wheel base, driving	13 ft. 3 in.
" " total (engine and tender)	50 ft. 6 in.
Length over all, engine	37 ft. 8 in.
" " " total, engine and tender	61 ft. 5⅛ in.
Height, center of boiler above rails	8 ft. 5 in.
" of stack " "	15 ft.
Heating surface, firebox	177.10 sq. ft.
" " tubes	1854.6 sq. ft.
" " total	2031.70 sq. ft.
Grate area	28.01 sq. ft

Wheels and journals.

Drivers, number	Six
" diameter	69 in.
" material of centers	Cast steel
Truck wheels, diameter	36 in.
Journals, driving axle, size	8 × 10½ in.
" truck " "	5½ × 1 in.
Main crank pin, size	6 × 6 in.
Parallel rod pins, size	{ 4½ × 4½ in., 6¼ × 5 in., 3 × 2¼ in., 4½ × 4½ in.

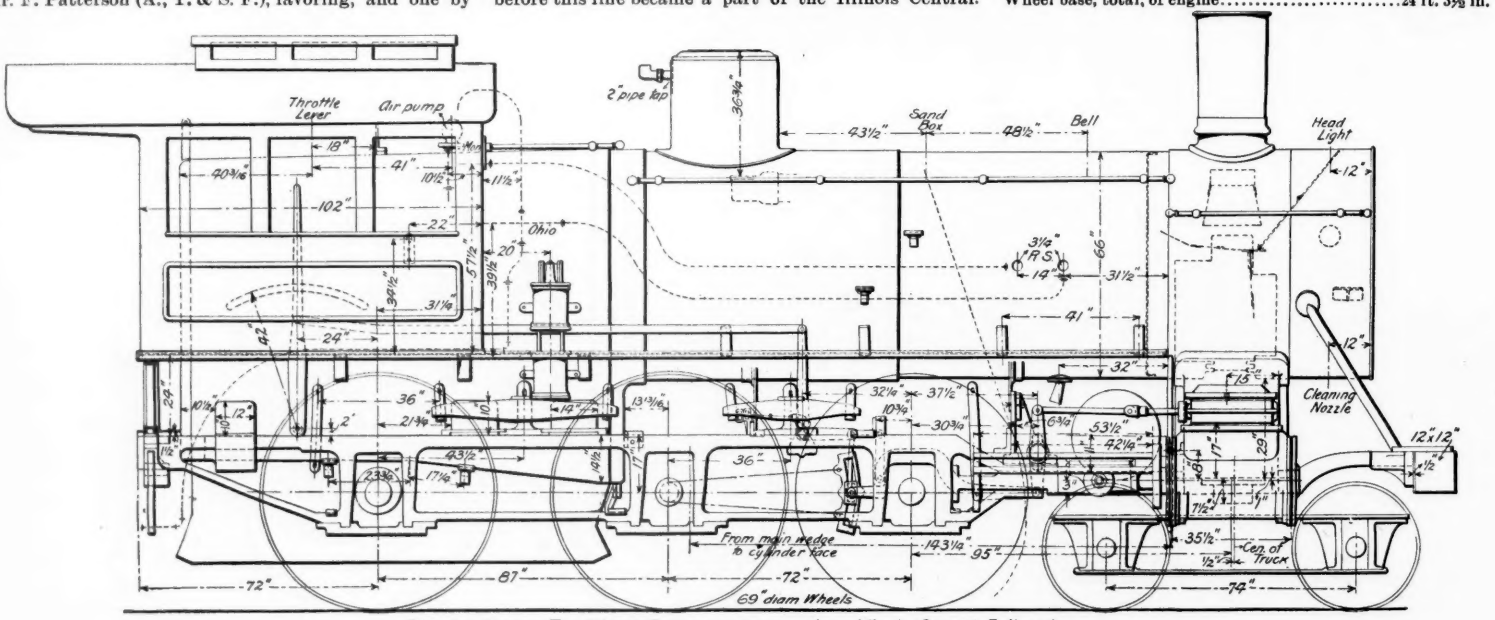


Fig. 2.—Rogers Ten-Wheel Passenger Locomotive—Illinois Central Railroad.

Crosshead pin, size	3¾ × 3½ in.
Cylinders.	
Cylinders, diameter	19½ in.
Piston, stroke	26 in.
" rod, diameter	3½ in.
Main rod, length center to center	9 ft. 7 in.
Steam ports, length	20 in.
" " width	1½ in.
Exhaust ports, length	20 in.
" " width	3 in.
Bridge, width	1½ in.
Valves.	
Valves, kind of	American balance
" greatest travel	5½ in.
" outside lap	1 in.
" inside lap or clearance	clearance 1/16 in.
" lead in full gear	1/16 in.
Boiler.	
Boiler, type of	Belpaire
" working steam pressure	180 lbs.
" material in barrel	Carbon steel
" thickness of material in barrel	9/16 in.
" diameter of barrel at front sheet	66 in.
Seams, kind of, horizontal	Butt jointed with inside and outside straps
" " circumferential	Double riveted
Thickness of tube sheets	½ in.
" crown sheets	½ in.
Crown sheet stayed with	1⅛-in. stays
Dome, diameter	32 in.
Tubes, number	261 "special"
" material	Iron
" outside diameter	2 in.
" length over sheets	13 ft. 5 in.
Smokebox, diameter	Outside. 67 in.
" length from tube sheet to end	66¼ in.
Firebox.	
Firebox, length	10 ft. 2½ in.
" width	2 ft. 8⅝ in.
" depth front	73¼ in.
" " back	63¼ in.
" material	Carbon steel
" thickness of sheets	Tube, ½ in.; Crown, ⅜-in.; Sides 5/16-in.; Back, 5/16-in.
" brick arch?	Yes
" water space, width	Front, 4 in; sides, 3½ in.; back, 3½ in.
Grate, kind of	Cast-iron rocking finger bars
Height of tank over collar	62 in.
Type of back drawhead	Cast iron
With or without water scoop	Without

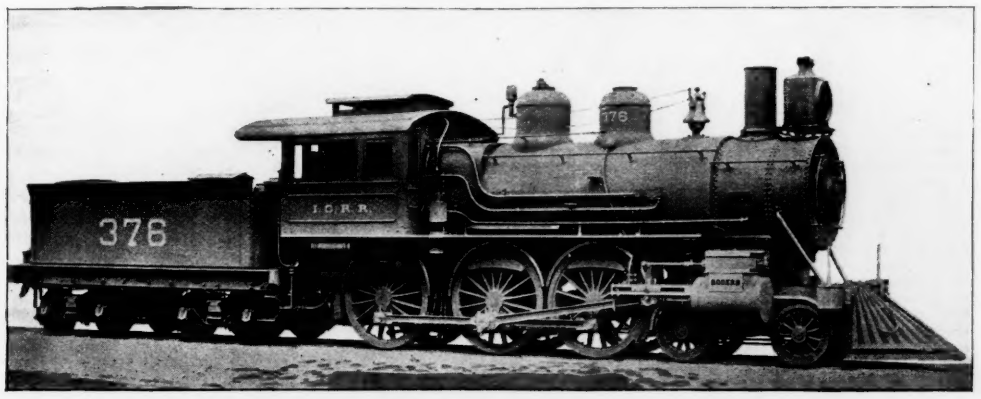


Fig. 1.—Ten-Wheel Passenger Locomotive- Illinois Central.

Other Parts.	
Exhaust nozzle	Smith's triple
Netting	Wire
" size of mesh	3½ × 3½ in.
Stack	Straight
" diameter	19 in.
" height above smokebox	3 ft. 8 in.
Tender.	
Type—six-wheel or with swivel trucks	Eight-wheeled
Tank capacity for water	4,200 gals.
Coal capacity	Six tons
Kind of material in tank	Steel
Thickness of tank sheets	¼ in. throughout
Type of under-frame, wood or iron	Wood
Type of truck	"Diamond" arch bar
Truck, with swinging motion or rigid bolster	Rigid
Type of truck spring	Elliptic
Diameter of truck wheels	36 in.
Diameter and length of axle journals	4¼ in. × 8 in.
Distance between centers of journals	60 in.
Diameter of wheel fit on axle	5⅜ in.
Diameter of center axle	4⅝ in.
Type of truck bolster	Wood
Length of tender frame over bumpers	22 ft. 9 in.
Length of tank	19 ft. 3 in.
Width of tank	8 ft. 8½ in.
Height of tank, not including collar	50 in.

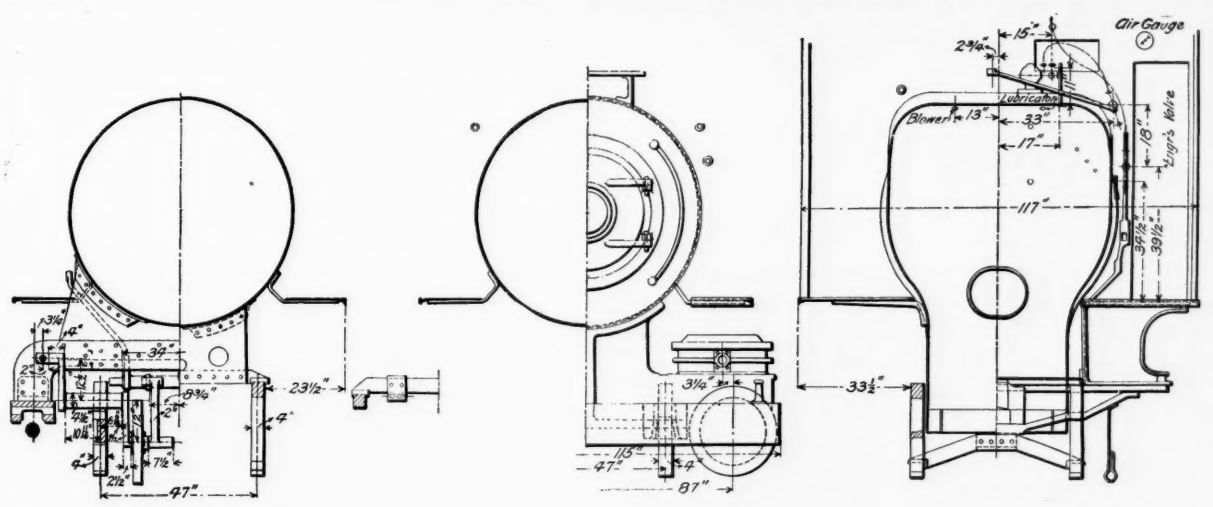


Fig. 3.—Sections of Illinois Central Ten-Wheel Locomotive.

Purchase of Swiss Railroads.

The Council of the Swiss confederacy has brought in a bill for the purchase by the state of the chief Swiss railroads. The charters of these railroads generally provide that they may be purchased after the expiration of a certain number of years, at a price equal to 25 times the average yearly earnings of the ten years preceding the time notice of the state's decision to purchase is given, but not less than the capital cost, less renewal and reserve funds. The time of purchase proposed in the bill is May 1, 1903, for three of the companies: for the Gotthard Railroad, May 1, 1909. The charters require several years' notice in some cases.

The Council estimates that the net earnings of the proposed state system will exceed by only $10,000 more than the interest on the capital required to purchase it if such interest should be 4 per cent., but that at 3¼ per cent. the surplus would be over $400,000, and at 3 per cent. nearly $900,000. The Council is of the opinion that under the charters and the laws, the Congress has a right to purchase the railroads without further legislation; but it recommends that the resolution to purchase be embodied in a law which will then be subject to a popular vote, or the *referendum*. "For this the political consideration is decisive, that the transfer from the private road system to state operation is a question of such high economical and political importance that it can be decided satisfactorily only in agreement with the majority of the Swiss people."

A law providing for a government audit of railroad accounts was submitted to a *referendum* last summer, and was then sustained. It was generally understood that this audit was a preliminary to state purchase, so that it seems most probable that the present project will be carried out.

Crucible Making and How They Should be Cared for.*

Before the present century, crucibles were made chiefly of sand and clay, but what we know as the modern graphite crucible, more commonly known as plumbago, or black lead, was orignated in the year 1827 by Joseph Dixon, then living at Salem, Mass. So it is to the present century, and to an American, that the world owes this useful invention. While the use of the Hessian sand crucible still lingers among assayers, and while English steel-makers still cling to the use of the one-heat clay crucible, the vast bulk of all the metals and their alloys is fused in the modern graphite crucible.

The theory of the graphite melting-pot is that, vastly better than anything else, it is a ready conductor of heat, and at one and the same time it is both strong and elastic. Again, it is refractory and durable. Being the best conductor of heat, the coal bill is minimized and quick melting possible. Being strong and elastic, it stands all reasonable shocks and accommodates itself to radically different temperatures. Being refractory, the most stubborn metals succumb and become fluid long before the walls of the pot show the slighest sign of collapse.

A successful crucible-maker must make constant chemical analyses of his materials, and he cannot have too much knowledge of the broad lines practised by his customers. The fusion-point of different metals is vastly dissimilar. This must be taken seriously into account. For instance, the crucible made for steel-melting is useless in a brass foundry. It is far more refractory, it is true, but if the brass melter employed a crucible intended for steel melting, it would slowly wither away in his lower temperature, where it would behave beautifully in a furnace with heat 1,000 deg. Fahr. higher.

Intimate knowledge of fuels and their function is also absolutely necessary to the crucible-maker, and he should know the nature of the fluxes used, and try to be informed of the crucible user's preference in fluxes.

Again, by slow and almost unperceived steps a very large use of the more fusible alloys has come, and come to stay. The market demands denser and stronger castings, and for this the fusion must be much more fluid. Hence the rapidly increasing use of phosphorus, aluminum and manganese. The use of these alloys not only adds strength and density to the castings, but promotes the fusion and increases the fluidity. This raises the question of the porosity or permeability of the wall of the pot.

So much for crucibles and crucible-making. We must now turn to the other half of my subject, viz., "How they should be cared for," by which is undoubtedly meant how they user should use them. First let me emphasize and iterate and reiterate that the value and life of a graphite crucible depend as much on the treatment it receives as on its own intrinsic quality.

In using a graphite crucible the first step is the annealing. When the crucible comes from the maker's kiln, where the temperature is very high, it is supposably "bone-dry." It is, however, a porous vessel, and it easily absorbs moisture; hence it should always be stored in a "bone-dry" place. I have seen crucibles stored in a shed where both rain and snow came through cracks and broken windows, and the crucible-maker, hundreds of miles away, was "called down," later on, because the pots "scalped."

As to annealing, both too little stress, and too much stress, can be laid to it. The best annealing is even heating. That is, evenly warm the pot, not on one side only but around the pot, to a temperature say between 250 degrees Fahr. and 300 degrees Fahr., and maintain that heat there until all moisture is expelled. Nothing more is required except equal good attention should be given to the even cooling all around of the pot.

Four weeks ago a customer repeated his order and said, "Please send better pots next time." Some of the previous lot, he added, "broke on annealing." How a crucible can break in the preliminaries of a proper annealing is, as yet, an unsolved problem. In this case we went to the stock and found in the rear of the pile one of the same batch as those that he complained broke on annealing. We took it to the boiler-room, where the fire was in fine shape, and without a moment's preparation or delay, threw the crucible on its side on the coal, where the heat was a bright cherry red. The pot stayed there some 25 minutes with boiler doors closed, until it was red-hot. We withdrew it from the fire and immersed it in a bucket of cold water and let it cool until it could be touched, returned it to the fire the other side down, brought it the second time to a red heat and gave it a second cold-water bath, and when it was once more cool enough to handle, it rang like a bell, and one could not see that anything had happened to it. This was from the same batch as the others that were reported broken in annealing. Our furnace-man asked us why we were treating the crucible in the manner that I have mentioned, and on being told that duplicates had broken in annealing, said, "I guess he annealed them with a sledge."

The pith of annealing is that the crucible walls should be heated and cooled off evenly, and that it receive heat enough and no more than enough to expel its accidental moisture. An additional word is specially suggested, if the crucible is a large one: after toasting its outside walls, set it over a black, low, slow fire, bottom side up, so that the inside walls as well as the outside can feel the good of the toasting process. Do not, for annealing purposes, set a crucible bottom down at an angle, say, of 30 degrees, in the hole of a hot furnace.

After annealing, the next thing is to get the glaze on the crucible as soon as possible, by as rapid first firing as possible, consistent with the safety of the pot. The furnace drafts and dampers should be so regulated as to produce a reducing flame instead of an oxydizing flame, the latter being always unfriendly to a graphite crucible.

A third hint concerns the fit of the tongs. In a fire hot enough for bross or copper fusion, the crucible becomes soft and pliable. In lifting it to pour, if the tongs do not fit or are not made to grip the crucible at the right place, you may, in the struggle to sustain the expensive charge, bend the pot too much, and it cracks.

Never allow any metal to cool in the crucible, but pour until the melting-pot is entirely empty. In the parlance of the shop, don't leave the crucible so you will find a "button" in the bottom when it is cooled off. After pouring the metal don't roll the pot out of doors where it will get rained upon, or place it on a bed of wet sand where it will absorb moisture. If you do, you put it exactly where, in its hot, soft condition, it will become spoiled either teetotally or partially. In lifting large pots by the crane, don't release the grip and let them drop 4 or 5 ft. on a stone floor; rather hold the grip until within 2 or 3 in. from the ground, and then drop them if possible on a bed of old dry sand. In filling the pot don't pack ingots or scrap too tightly. Expansion and contraction go on in the heating and the cooling, and a little gumption is necessary to prevent the pot from being strained or cracked.

In ordering your crucibles, give the maker a hint, first

* By John A. Walker, of Jersey City, N. J., Vice-President and General Manager of the Joseph Dixon Crucible Co. Extracts from a paper read at the Convention of the American Foundrymen's Association, Detroit, May 10, 1897.

as to your fuel—whether coal, coke, gas or oil; then, as to the metal you melt; also, if possible, your average time of heat. He can then send a pot better adapted to your special work.

For causes of failure, or unreasonably short life, in a crucible we may mention:

First. The wrong kind for the service: either a pot unsuited to the furnace, to the metals or to the fuels.

Second. The life is shortened by rough handling, a great deal of which is unavoidable.

Third. The life is shortened by corrosive fluxes.

I must ask great respect for the graphite crucible. There are not many men, and not many things in this world for which there are not substitutes, but for the graphite crucible there is no known substitute. It is a fragile thing, and you ask it to do and stand what nothing else in this wide world can do or can stand.

The Thornburgh Coupler Attachment.

The Thornburgh Coupler Attachment Co., of Detroit exhibited at the meeting of the Master Car Builders Association, at Old Point Comfort, Va., a new device for attaching couplers to the draft-rigging of cars, which is shown by the accompanying illustrations. Fig. 1 is a view of the under side of the draft-rigging with the attachment in position to remove the coupler, springs and follower plates; Figs. 2 and 3 are sections with the couplers in place, while Fig. 4 shows the details of the attachment.

This arrangement consists of two malleable iron cast-

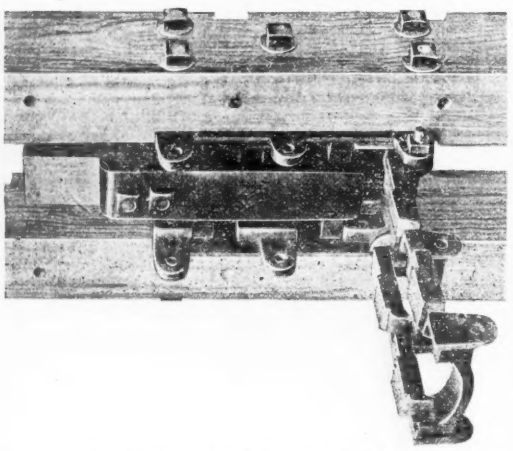


Fig. 1.—Thornburgh Coupler Attachments.

ings, one being a case which fits between the draft timbers and is bolted to each timber by five 1-in. bolts; the other part is a spider which forms the bottom of the attachment, and is joined to the case by means of three ¾-in. bolts; the spider forms the slide on which the coupler rests. The parts are designed to conform in all respects to the requirements of the M. C. B. recommended practice for draft attachments, while containing but one-third the number of parts of the usual attachment.

As will be seen from Figs. 2 and 3, the coupler is held in place by the standard coupler yoke, follower plates and springs. The followers are held between vertical stops cast on the sides of the case which limit the movement of the springs to 1⅜ in. Fig. 4 shows how the spider is swung down, by the removal of the two forward bolts when it is desired to replace the coupler. The ease with which this operation can be performed, the simplicity of the construction, the reduced number of

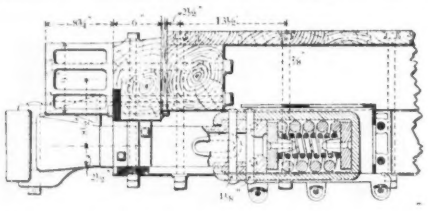


Fig. 3.—Vertical Section—Thornburgh Coupler Attachments

parts, low cost of maintenance and increased strength are the principal claims made for this form of attachment. An important feature, however, is the protection afforded the springs by being within the metal case.

Kinds of Signaling Apparatus in Use in England and Scotland.*

[Note.—In the following paragraphs "1" means description of block, and "2" indicates the kind of electric interlocking and to what extent it is in use.]

Caledonian.—1. Tyer's three-plunger semaphore block. 2. Modified system of interlocking in combination with Tyer's three plunger semaphore block on 50 sections of new city and suburban lines.

Great Eastern.—Tyer's one-wire double line. Tyer's one-wire single line. Tyer's tablet block. Sykes' lock and block. Single-needle block on joint line, March to Doncaster. 2. Sykes'. Metropolitan District—Liverpool street and Fenchurch street to Ilford, on Colchester line; to Tottenham on Cambridge line; Woolwich and Enfield branches, and to Leyton on Loughton branch; in all, 50 signal boxes and 1,022 levers.

Great Northern.—1. Three-wire single needle and bell. Blakey & O'Donnell's apparatus. Sykes' electric slots and signal reverses. 2 Electric locking applied to 13 sections in various places.

Great Western.—1. Spagnoletti's three-wire disc. Electric train staff. Webb & Thompson's. Tyer's one-wire block. 2. Spagnoletti's at about 12 different points. Spagnoletti's one-wire on Hammersmith and City Joint lines.

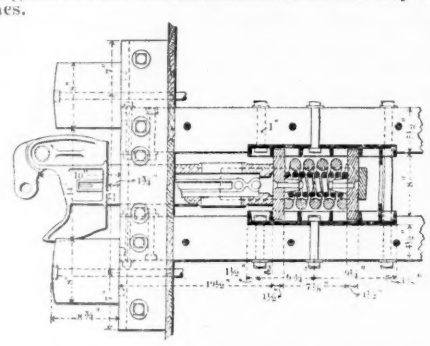


Fig. 2.—Horizontal Section—Thornburgh Coupler Attachment.

Glasgow & South Western.—1. Tyer's one wire. Tyer's train tablet. 2. None.

Lancashire & Yorkshire.—1. Three-wire absolute and Tyer's one-wire. 2. Nicholson's electric locking at one or two boxes.

L., Brighton & S. C.—1. Tyer's semaphore, 373 miles. Sykes', 43 miles. Webb Thompson's train staff, 50 miles. 2. Sykes' system, 43 miles. 11 miles (country district), Saxby & Farmer's.

L., Chatham & Dover.—1. Sykes' double-arm bell. S.N. instruments with bells (Metropolitan and Extension, and main line to Swanley). 2. Throughout. Sykes', with 80 treadles. 67 Sykes' fouling bars. 57 Sykes' electric shunting signals. 76 electric facing point detectors, etc., etc.

L. & North Western.—1. Three-wire constant current, and small portion one-wire. 2. None, except (in a few instances) electric interlocking between sidings at a distance from station, with controlling signal.

L. & South Western.—1. Three-wire (Preece's). One-wire (Preece's). Tyer's tablets. Needle block and bells, three-wire. 2. Three-wire block and Sykes' interlocking, 111 miles. Tyer's tablets and Sykes' interlocking, 141 miles.

Hull & Barnsley.—1. Webb & Thompson's tablet on branch line, 12 miles. 2. Sykes', about 60 miles. Sykes', 60 miles.

Manchester, Sheffield & L.—1. Single-needle three-wire. 2. Evans' interlocking for about 10 miles. Sykes' at Hawarden Bridge, and special arrangement of Mr. Hampson's at the two swing bridges at Keadley.

Metropolitan District.—1. Sykes'. 2. Sykes' system in use nearly throughout.

Metropolitan.—1. Spagnoletti's three-wire. 2. Spagnoletti's throughout.

Midland.—1. Single-needle three-wire. 2. Langdon's interlocking, about 12 to 15 sections.

North British.—1. Three-wire needle (Tyer's). One-wire needle (Tyer's) Tyer's tablet. 2. None.

North Eastern.—1. Three-wire single-needle. Webb & Thompson's train staff. 2. None.

North London.—1. Pfyce & Ferreira's three-wire throughout. 2. None.

South Eastern.—1. Walker's one-wire semaphore improved. 2. Sykes' throughout Charing Cross and Cannon street lines. Safety bars at Cannon street.

North Staffordshire.—1. Tyer's one-wire and Neale's one-wire. 2. None, except at intermediate sidings where points and signals are electrically locked and interlocked by Neale's Electric Locking.

SYKES' SYSTEM OF ELECTRIC INTERLOCKING IS IN USE AS UNDER.

	Levers Locked.		Levers Locked.
Dublin, Wicklow & W.	8	L., Brighton & S. C.	618
Great Eastern	1,022	L., Chatham & D	1,350
Glasgow & S. W.	26	Met. Distr ct	136
Hull & Barnsley	254	Mersey	121
Liverpool Overhead	21	South Eas tern	283
London & South Western	1,051		

* From a paper by F. I. Hollins, Telegraph Superintendent of the Great Eastern Railway, read before the Institution of Electrical Engineers, London, January 28, 1897; reprinted from the *Railway Engineer*.

Railroad Legislation in Texas.

Legislation affecting railroads in Texas was enacted by the recent legislature of that state as follows:

House Bill No. 62. An act for the relief of railroad corporations chartered since January, 1887, and which have failed to construct their roads within the time prescribed by article 4 558 of the Revised Statutes of

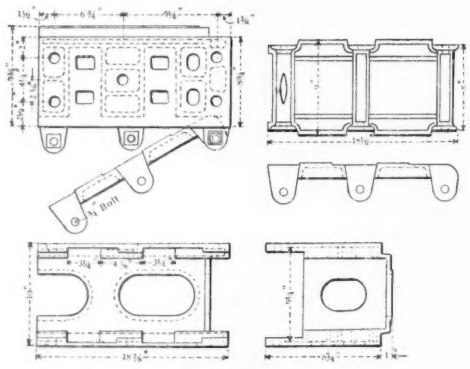


Fig. 4.—Details of Thornburgh Coupler Attachments.

Texas, by extending the time for such construction two years from February 25, 1897.

Senate Bill No. 6. Fixing the limitation of time for actions for personal injuries or injuries resulting in death. This act requires the commencement and prosecution of suit for personal injuries or injuries resulting in death within two years after the cause of action shall have accrued. Where the injuries result in death the cause of action shall be considered as having accrued at the death of the injured party.

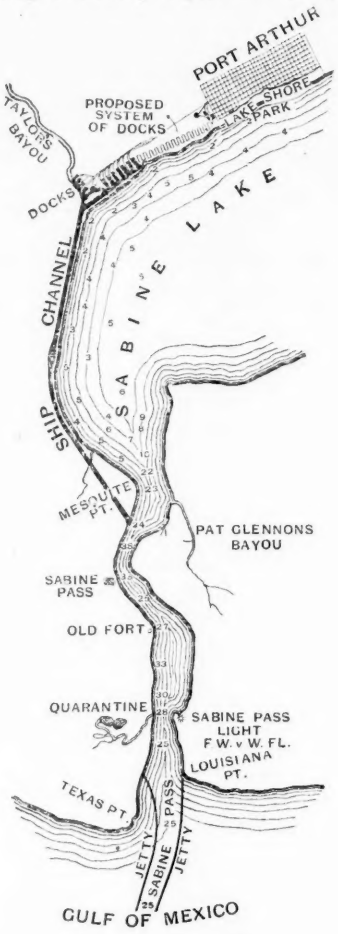
H. B. No. 65. To punish the willful throwing of missiles or firing of guns or other firearms at or into any train, whether moving or standing, or into any depot, public or private house, sail or steamboat. The punishment is a fine of not less than $5 nor more than $1,000, or imprisonment for not more than two years.

H. B. No. 115. Amending articles 744a and 744b, relating to the construction of union depots by corporations; empowers private corporations to own, maintain and operate union passenger depots in any city where two or more companies may own and operate a railroad. These corporations are authorized to acquire and operate not more than three miles of track. Article 744b provides that the issuance of stock and bonds of such corporations shall be governed by Chapter 14, Title 94 of the Revised Civil Statutes, but railroad companies may own stock or bonds of such corporations.

S. B. No. 30. Enabling the Railroad Commission to make emergency freight rates, to prevent interstate rate wars and injury to the people and railroads of the state. Emergency rates are made effective upon three days' notice, and apply to all roads or to such roads as the Commission may designate.

S. B. No. 158. Requires contracts for the conditional sale or hire of cars and engines to be recorded in the office of the Secretary of State.

S. B. No. 7 is an act of the special session, prescribing and defining the liability of persons, receivers or corporations operating railroads or street railways, for injuries to their employees; defining who are fellow-servants, and prohibiting contracts between employer and employee based upon the contingency of the injury or death of the employee limiting the liability of the employer for damages. This law radically modifies the doctrine of fellow-servants which has prevailed in Texas for some ten years. Nothing in the act is to be held to impair or diminish the defense of contributory negligence when the injury of the servant or employee is caused proximately by his own contributory negligence.



Port Arthur Ship Canal.

The Port Arthur Ship Canal.

The Kansas City, Pittsburgh & Gulf Railroad, whose southern terminus is at Port Arthur, Tex., is building a ship canal from its docks at that place to deep water in Sabine Pass. Port Arthur is on Sabine Lake and the canal will extend along the western side of the lake to the town of Sabine Pass, about 8½ miles. The route of the canal and the situation of the railroad company's docks at Port Arthur are shown in the map, which shows the depth of water in the lake and pass.

It was originally proposed to dredge a canal through Sabine Lake, but it was found that this would entail lawsuits and delays, and later the present route was decided upon. The canal will be 175 ft. wide at the water line, 25 ft deep and 75 ft. wide at the bottom. Borings which have been made show that the canal will be through hard clay formations throughout. It is estimated that 515,000 cu. yds. of material will be excavated per mile. The company is now building extensive railroad terminals at Port Arthur.

Arrangement for Carrying Bicycles—Norfolk & Western Railway.

The Norfolk & Western has equipped its baggage cars to carry bicycles, and the accompanying engraving, Fig. 1, shows an arrangement of safety bars and hooks for supporting the bicycles at the top of the car out of the way of other baggage. Wrought-iron holders covered with rubber hose are fastened by screws to blocks placed between the carlines in the center of the roof. These holders are spaced in pairs 3 ft. 8 in. apart throughout. The straps shown by Fig. 2 are fastened to either side of the car, central with each pair of bicycle-holders, and the safety bars, also shown in detail, are placed across the top of the car between each set of holders and straps.

In loading bicycles they are inverted and the holders

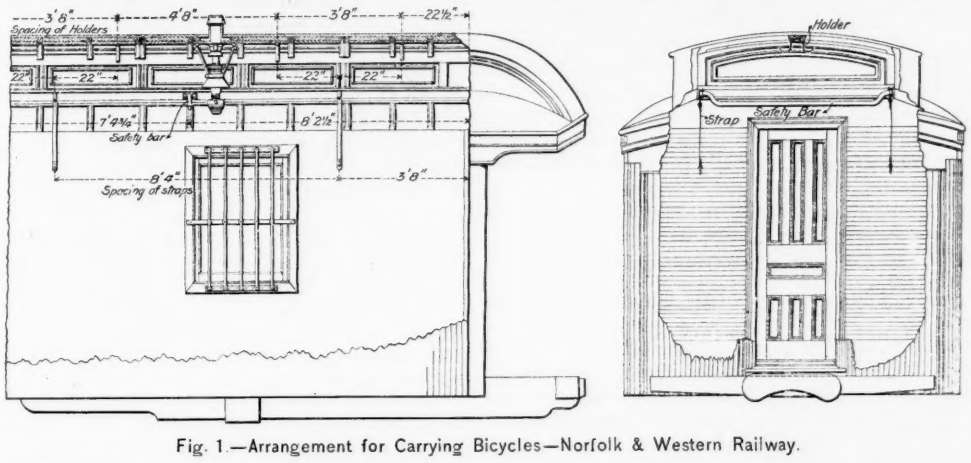


Fig. 1.—Arrangement for Carrying Bicycles—Norfolk & Western Railway.

in the center of the car roof are hooked into the rims of the two wheels. The frame of the bicycle is then tilted up toward the side decks, the strap being wrapped a few times around the frame, after which its end is slipped over the hook, thus holding the wheel in place A small stool is carried in each baggage car by the use of which the straps are easily reached. There is provision in the long baggage cars of the Norfolk & Western for carrying 16 bicycles, in the short baggage cars for 12, and in the combination baggage and passenger cars for eight bicycles. This arrangement was designed by Mr. R. H. Soule, Superintendent of Motive Power, to whom we are indebted for the drawings.

The Chevres-Geneva Power Transmission.*

The present scheme provides for the transmission of from 12,000 to 15,000 H. P. to the town of Geneva. The site chosen for the power station is on the banks of the Rhone, below its junction with the Arve, and it is found that when one river increases the other diminishes, the combined flow not varying more than from 1,500,000 to 16,000,000 gals. per minute. The works comprise a weir having a useful width of 256 ft., with a pier of masonry in the center. It consists of sluices, having an opening of 9·8 ft., and its sill is 2·9 ft. below the mean level of the river, and the

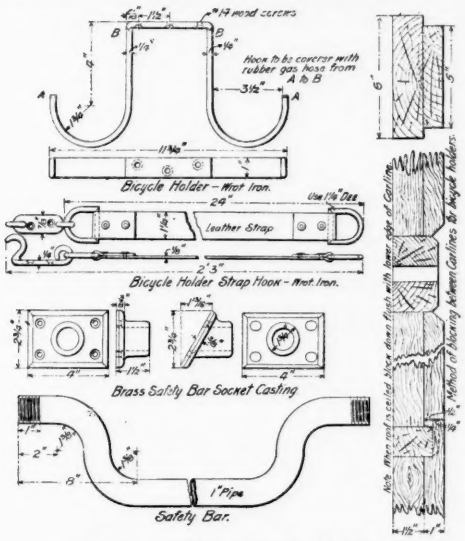


Fig. 2.—Details of Bicycle Holder.

difference in level at low water is 26 ft. The sluices are worked by an electric motor, but a steam-engine is provided as a stand-by. Above the weir, on the left bank of the river, is a canal, 131 ft. wide. A grid is placed at the entrance, and a finer one at the end nearest the turbines. The turbine house is below the weir, and is connected to it by an abutment; it is capable of holding 15 double turbines of from 800 to 1,200 H. P., the sluices for which are worked by electric motors. The canal forming the tail-race is of the same width as the other; and a dam 361 ft. long is provided to prevent the eddies affecting the level of the water when it leaves the building.

The double turbines each comprise two reaction turbines mounted one above the other on a vertical shaft making 55 revolutions per minute. Their efficiency is estimated at 74 per cent. The dynamos are direct coupled to the turbines, and the combined weight, together with the action of the water, causes a pressure of some 30 tons on the bearings. The friction is overcome by forcing oil into the bearings under a pressure of over 2,000 lbs. per square inch, thus balancing the weight and lubricating the surfaces. An electrically driven pump forces air into a reservoir containing the oil, and the latter after use is filtered and again employed. A reservoir containing air under a pressure of 4,000 lbs. per square inch is kept as stand-by in case of the pumps failing. The oil flows at the rate of about 2½ gals. per minute. Three dynamos are at present fixed, each consists of two single-phase alternators, superposed, with seperate winding and excitation. They are so constructed that the current in one machine lags behind that in the other by a quarter period, thus giving a two-phase current, of which each phase can be separately regulated, but by an easily made alteration they can be made to run in synchronism, and if coupled in series can give a single-phase current of double the pressure of one machine. Each machine consists of a steel ring of C-shaped section, which is covered by a movable bell-shaped cylinder, having internal polar projections which, when opposite the opening in the C, form a closed magnetic circuit. The field winding is placed within the ring, and the turns are perpendicular to the axis of rotation of the bell. The armature windings are flat coils fixed to a laminated cylinder, forming the lower "lip" of the C opposite the polar pieces. This construction obviates the necessity for any brushes or sliding contacts, and the high tension winding is well protected; moreover, repairs are easily effected. The pressure is raised by transformers to 3,000 volts. The alternators are excited by means of two vertical continuous current machines of 120 H. P. each, driven by special turbines; these machines furnish current also to various motors in the works.

The line connecting the generating station with the station at Geneva is underground, and comprises four conductors, its length being about 3¾ miles. The conductors are each of seven strands, having a sectional area together of 0.76 sq. in.; these strands are bare and are laid on terra-cotta supports impregnated with tar fixed in a concrete culvert about 1 ft. 6 in. below the surface of the ground. A mixture of gravel and tar is poured into the culvert so as to completely surround the conductors and their supports; in order to render the mixture more elastic, a certain proportion of vaseline oil is mixed with the tar while hot. The gravel is carefully dried immediately before use. At first some trouble was experienced on account of the presence of foreign matter and moisture, but the line is now very satisfactory; the co-efficient of self-induction of each phase is small, and the co-efficient of mutual induction between the two phases very small indeed, and there is an absence of skin effect. The current is utilized in several ways at Geneva. A portion is used to feed a network formerly supplied by single-phase alternators. Another portion is transformed to a pressure of 500 volts and distributed on mains for street lighting. A separate transformer is provided for each arc lamp, lowering the pressure to 40 volts and giving a current of 15 amperes; the lamps are balanced as evenly as possible between the two phases. It is intended to also distribute power from these mains at a later date. Some of the current is transformed into continuous current at 220 volts, and is used to feed an old three-wire network.

*Reprinted from the *Abstracts of Papers* published by the Institution of Civil Engineers (Eng.), 1897.

De Volson Wood.

De Volson Wood died at the home of his brother in Hoboken, N. J., last Sunday, at the age of 65. Professor Wood was born near Smyrna, N. Y., graduated from the Albany Normal School in 1853 and two years later from the Rensselaer Polytechnic Institute. He went immediately to the University of Michigan as Professor of Civil Engineering and remained there for 15 years. Thence he went to the Stevens Institute of Technology as Professor of Mathematics and Mechanics, and in 1885 became Professor of Mechanical Engineering at the same institution, and that chair he held at the time of his death. His whole working life was spent in teaching, and in fact he began teaching when he was only 17. But like other professors he found time to write a number of books, as follows: "Trusses, Bridges and Roofs," published in 1872; "Wood's Edition of Mahan's Civil Engineering," published in 1873; "Treatise on the Resistance of Materials," published in 1875; "The Elements of Analytical Mechanics," published in 1876; "Wood's Edition of Magnus' Lessons in Elementary Mechanics," published in 1878; "Co-ordinate Geometry and Quaternions," published in 1879; "Key and Supplement to the Elements of Mechanics" and "Key and Supplement to the Mechanics of Fluids," both published in 1881; "Trigonometry," published in 1885; "Thermo-Dynamics," published in 1887 and enlarged in 1889, and "Turbines," published in 1895.

Professor Wood contributed to various mathematical and scientific journals, and to various magazines, books, etc. Among his articles appearing thus may be mentioned "Alligation," to the *New York Teacher*, and highly commended in Brook's History of Arithmetic; "Foundations," in Johnson's Cyclopedia; "Mechanics," in Appleton's Cyclopedia of Mechanics; "The Luminiferous Ether," probably the best monograph in the language on this subject, in the London *Philosophical Magazine*, and in Van Nostrand's *Engineering Magazine*, and also *Science Series*, No. 85; "Radiant Heat not an Exception to the Second Law of Thermodynamics," in the *American Engineer*. He was a member of the American Society of Civil Engineers, the American Society of Mechanical Engineers, the American Association for the Advancement of Science, the Association for the Promotion of Engineering Education (of which he was first President), the American Mathematical Society, and honorary member of other bodies.

Professor Wood was a man of wide and enviable reputation. It had been the fortune of many generations of students to sit under his teachings, he had written books which are standard in the technical schools and among engineers, and he had been active all his life in written and spoken discussions before the several societies of which he was a member. Furthermore, he had personal qualities which impressed themselves promptly and strongly upon those who came in contact with him, and as a consequence of all these conditions he was one of the best-known professors in the United States. But beyond all that lay extraordinary ability as a mathematician and as an analyist, remarkable strength and simplicity of character and a genius for teaching which made his reputation a good deal more than temporary or local.

Professor Wood was a man of considerable practical mechanical ability, but that ability had never been turned to very important results. His powers as a mathematician, however, have given him a permanent place in the literature of engineering, and no student of the higher mathematics of engineering can remain ignorant of the name of DeVolson Wood. But his real greatness was as a teacher. In one sense perhaps that is a misfortune for a man, because he leaves no monument except in the hearts and in the minds of the men who actually came under his personal influence. His fame becomes a tradition, fading away and gradually disappearing. On the other hand, is this not the very best work that a man can do in the world—the work of a really strong and sound teacher?

It would be difficult to sum up in a few words all the qualities which made Professor Wood great as a teacher, but the fundamental quality was his own downright sincerity and his faith in his own work; his mind knew only one test, and that was the truth. To him things were either right or they were wrong, and facts were facts or they were not facts, and he saw no occasion for trying to find any middle ground. But the pursuit of the truth is often enough an arid enterprise, and a man needs more than his own sincerity to get young men to follow him eagerly in that enterprise; and Professor Wood did get his students to work with alacrity, with eagerness, with enthusiasm. A strong element in this was his own rugged and wholesome enthusiasm; another was his air. His solid and robust figure, his keen eye and square jaw, his frank and ready smile—all these were part of his influence on the young men. Added to the genuineness which appeared in all his speech and all his manner was a gift of geniality. The youth who came in contact with him could not help feeling that he stood before a real man, a man strong and sound, mentally and physically; and while youth is not very analytical it is impressed by a man of such quality without knowing why it is impressed. The writer of these words, who had the fortune to sit under Professor Wood four years in civil engineering, can testify that no other teacher ever gave him such hard lessons or ever got out of him so good recitations, and yet there was no sense of hardship in it. It seemed a natural and inevitable thing to work about five times as hard for Professor Wood as for any other teacher, and this perhaps was largely a result of his own enthusiasm in the work. He had furthermore a gift of personal interest in his students. Probably a very small percentage of his pupils—and they must have been very unworthy students at that—failed to feel that Professor Wood had a particular personal interest in them. It was not that he took any special trouble with any one man, but he was always able to carry a man's personality in his mind, and he seemed always to be interested in knowing something about a man's career. And so it came about that his influence on the lives of his students did not cease when they left his class-room.

Professor Wood was an active and sincere Christian gentleman, always interested in good work and always exerting a good influence in the community about him. Among a select body of students his name will be known and honored for generations to come as the name of a clear and able writer on the mathematics and mechanics of engineering; among a great body of teachers, students, engineers and administrators he is remembered in gratitude and love as a strong and wholesome and stimulating friend.

Foreign Railroad Note.

The Hungarian authorities have abolished the large bell signal for starting; hereafter notice will be given by calling out the Magyar equivalent of "all aboard" and an electric bell only. The large bell was a third signal. This triple signal for starting was formerly the rule in Austria also, where the bell tap signal was abolished some years ago.

RAILROAD GAZETTE

ESTABLISHED IN APRIL, 1856.

Published Every Friday,

At 32 Park Place, New York.

EDITORIAL ANNOUNCEMENTS.

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers, can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

The verdict of the coroner's jury in the matter of the disaster at Valley Stream, L. I., where, on May 30, five persons riding in a coach were killed at a crossing by a locomotive, says nothing about responsibility, except that the Long Island Railroad was criminally negligent in not keeping the electric bell in order. And this in spite of the fact that the coroner in his charge to the jurymen told them that under the law every one about to cross a railroad has a duty to listen for the approach of trains. The coroner added a word to the effect that a man excited by imminent danger could not be held to the exercise of the accurate judgment that would be demanded of him under other circumstances; but as the evidence, as reported, indicates that the coach driver in this case did not think of the train at all until his foremost horses were either on or very near the track, it is not clear how this dictum applies. It is possible that the verdict was silent on all other points except that mentioned, because the evidence was weak or conflicting: but in that case common sense would seem to dictate that the reason for the absence of a finding should be mentioned. A collison between a railroad train and a coach in broad daylight, at a traveled crossing, where no confusing noises distracted attention must have been very largely due, in the absence of accident to vehicles or misbehavior of horses, to some person's carelessness. This seems almost self-evident, and remains true even if we allow that the presence of trees obscuring the view of the track affords considerable excuse for a careless driver. Failure of the electric bell, *if* it did fail, is a secondary cause at best. No man possessed of ordinary judgment will trust to his ears alone in such circumstances as those at Valley Stream on May 30, and, indeed, the coroner should have mentioned the duty of wayfarers to look as well as to listen. This verdict must be set down as one of the stupidest ever rendered, and that is a superlative indeed.

"Sixty-five dollars to San Francisco and return" is now placarded in the windows of railroad offices in New York City, and as this rate is good by the longest routes, with perhaps a side trip thrown in, the sum named represents considerably more than 6,600 miles of travel. Such a low rate draws large numbers, not only of Christian Endeavorers, but of people who are simply endeavoring to get as long a ride as they can for their money, and it is predicted at Chicago that over 25,000 people will go to the Pacific Coast within the five days that the going tickets are valid. Between the morning of June 30 and the evening of July 5th, 27 special trains are scheduled to pass through Denver, Colorado Springs and Pueblo, and westward over the Denver & Rio Grande. Most of the Christian Endeavor excursion parties stop over a day or two in Colorado or Utah or both. There have been reports of slight secret reductions of rates by some of the roads west of Chicago, but nothing very definite. The rates for the present excursion are spoken of by many as the lowest ever made to the Pacific Coast, but they are not. The one-way rate of $25 from Chicago to San Francisco, which is equal to 1·06 cents a mile, is very low, but it was excelled in cheapness away back in 1886. The regular rate from Omaha to San Francisco, for many years after the opening of the Pacific railroads, was $100. In 1886, during a violent rate war, reductions followed one another rapidly, and single-trip tickets were sold as low as $5 from the Missouri River to San Francisco, and at $1 from San Francisco to Omaha. Again in 1894 the through rate went down temporarily to $20. The $100 rate was maintained practically without interruption from 1869 to 1883, when it was reduced to $95. The war of 1886 brought it down to $60 ($50 limited), the emigrant rate being then reduced to $35. For about two years after this war there was a round-trip party rate of $60, which afterward was changed to a rate of $80, good for single passengers and limited to six months. In May, 1891, the emigrant rate was abolished, and a second-class rate of $40 was established. The round-trip rate during the mid-winter fair, 1893-4, was $65 50. The regular round-trip rate, formerly $80, is now $90, and the tickets are good for nine months.

Elsewhere in this issue will be found a brief outline of the plans now being prepared by the Sanitary District, Chicago, for the swing bridges across the Drainage Channel. There are many features of this work which will be of interest to engineers, but the most important structure will be the eight-track bridge where the Pittsburg, Cincinnati, Chicago & St. Louis, the Chicago & Northern Pacific and the Union Stock Yards & Transit Co.'s tracks cross the channel near Thirty-first street. The comparative estimate made by the engineers of the sanitary district showed that the cost of swing bridges was about equal to the cost of fixed bridges, but was less than that of other types of movable bridges and as a result of this comparison the plans for the enormous eight track bridge were prepared. These plans, however, must be approved by the railroad companies interested before the work can be commenced. In selecting a bridge suitable for this point there are a number of considerations which should be taken into account besides the mere question of cost, and the requirements of the future should also be provided for as far as possible. The Drainage Channel will probably become, in time, an important addition to the harbor at Chicago, and be used extensively by the lumber, grain and other large shipping interests, thus removing many of the yards and elevators from the crowded districts bordering the Chicago River. It may therefore be expected that many vessels will use this channel. The railroads which cross it now handle a heavy traffic which will be increased when the canal is completed. It may be, therefore, that in selecting the swing bridge as the type to be used, too much weight has been given to the matter of cost and that the loss by delays to vessels and railroad traffic has not been sufficiently considered. Various lift bridges which have recently been built at Chicago have worked well, and have been found better adapted for narrow channels, where the bridges must be opened often, than the more common swing bridge. There is also an advantage with the lift bridge in that the channel is not obstructed by a central pier and with the rocking bridge when the bridge is open, the tracks or roadway, as the case may be, are completely blocked, which makes the lift safer to use than the swing bridge. A further advantage of the lift bridge, where there are a number of tracks, is that each pair of tracks can be arranged to work independently of the others so that if one bridge should be cut out of service from any cause the traffic can be carried over the other bridges. While the design made by the Sanitary District will provide a structure of ample strength to carry the loads, yet in the effort to economize important considerations seem to have been neglected which may more than offset the expected saving.

The American Society of Civil Engineers.

Major Harrod's address as President of the American Society of Civil Engineers is designed to call attention to some of the proper relations of a national society to the profession. This he does in dignified and judicious language and with such entire absence of the spirit of controversy that the vainest and most touchy localist may read what the President says without becoming contentious. We strongly advise all engineers to read that portion of the address which we reprint and later to get the address in full and read it again. It carries with it a weight beyond that of the mere written words. One feels behind it the experience of a man who has spent long years in zealous and faithful pursuit of a noble profession.

In almost every particular we can commend what Major Harrod says and thoroughly agree with him. We are disposed, however, to question the wisdom of the proposition to change the method of electing members of the American Society of Civil Engineers so that the ultimate decision shall be made by the Board of Direction. To begin with, there is always in the American Society of Civil Engineers an element of more or less importance which is afraid of the concentration of power in the hands of a small group of officers. This fear generally finds its expression in talk about the New York ring. Of course it is absurd, but it is just as well to avoid exciting this class of members unless some really important object is to be gained.

The only object is to prevent the injustice of the blackballing of a candidate by a small group of ignorant or malicious members who could be banded together under the cover of the secret ballot. Theoretically, this may easily happen: practically, it seldom happens. We remember very few instances in which the case in favor of a defeated candidate has been so clear and strong that he would probably have been elected if the Board of Direction had had the final decision, and we have known something about the particulars of a number of cases in which appeals, successful or unsuccessful, have been made for the second ballot.

The members of the Society can undoubtedly protect themselves against unwise action on the part of the Board by informing the Board of the objections against any candidate, and this is the first and proper thing to do. When a name goes out on the blue list is the time for objections to be sent in. If objections are reasonable and well sustained the whole matter ends there. The chance that this name will ever go to ballot is remote. If the power to elect rested with the Board it would probably be found true that objections sent in by the members would still be precisely as effectual. Therefore, it may be said that we are arguing against our own position and that the Board should elect, and that the members should act by appeals to the Board rather than through the secret ballot.

On the other hand, it may often happen that members do not know of a certain candidacy until it is too late to send in written objections to be considered by the Board; or in extreme cases a member might be justified in declining to send in written objections. We never experienced any such difficulty, but we can easily see how it might exist. Every member of the Society cannot feel perfect confidence in the good faith and discretion of every member of the Board of Direction, and it may well happen that a man is justified in not hazarding important business matters on a written objection to be laid before the Board.

The privileges of the members and the character of the membership are the most precious trusts that the Board of Direction has, and we thoroughly agree with Major Harrod that the standard of membership should always be crowded up, and one way of doing this is to preserve the opportunity for the defeat, by secret ballot, of a candidate who for some reasons cannot be well kept out by other means. This, of course, presupposes an almost superhumanly high standard of conduct and of society spirit on the part of the membership at large, and theoretically it places a man's fortunes at the mercy of a small percentage of men whose standards are low. Practically, however, we doubt if many cases of injustice can be traced to this source.

The Canals and the Railroads.

Receipts of grain at New York by canal from the opening of navigation to June 19, 35 days, have been less than 4,000,000 bushels, while the railroads from the West have, during the same time, brought in 13,365,370 bushels; and the boatmen are loudly complaining of the railroads, as they always do when boating business is dull. The Boatmen's Association, which early in the season established a tariff on the basis of 3¾ cents a bushel on wheat, Buffalo to New York, has been compelled to reduce this rate to 2½ cents a bushel, which makes the corn rate 1¾ and the oats rate still lower. As the boatmen, if we may judge from their statements in previous years, are unable to make any money when the rate is less than three cents, we may well believe their present asseveration that they do not care enough about the business to go after it. They say that the New York Central has carried the lion's share of the grain this year, and the Erie and the West Shore are said to stand second and third in the list. The boatmen, always disposed to blame everybody in sight, also say that the Buffalo brokers, who are the shipping agents, have turned over to the railroads a great deal of grain that was intended for the canal. There appears to be no evidence of this, however, ex-

cept the fact that the grain has gone by railroad, and it is, perhaps, not unfair to assume that the grain was "intended" to go by whatever line would take it the cheapest and give the best promise of delivering it at the desired destination most nearly on the time at which it would be wanted.

The railroads seem to be pursuing the same policy by which in 1895 they took a great share of the grain business away from the canal. General business being dull, and cars being plenty, they have abandoned their agreement to maintain uniform rates to the seaboard by all lines and have taken the grain for what they could get. Whether they have gone as low as 1.8 mills per ton per mile, at which it was reported, and not disputed, they took large quantities in 1895, does not appear, but they have no doubt come pretty near that rate. We are sorry for the b atmen, but we do not see what they can do. Their own law, forbidding the formation of any boat company with more than $50,000 capital is deadly to them; and even the nine-million-dollar deepening of the canal is an apple with some ashes in it, for the overhead bridges are not raised and deeper boats cannot be used unless they are ballasted going back, because when empty they will not go under the bridges.

The only advantages of the canal are cheapness and slowness. The railroads appear to be able to neutralize the first, while still making some money for themselves, and the second is not an advantage at all except when, as at the approach of winter, the shipper wishes to delay unloading at New York several weeks or months. Probably the boatmen are still puzzled to explain how a railroad can make money carrying corn at 2 mills per ton mile; but a little calculation shows not only that there is a profit at this rate but that there may be quite a substantial profit. A train of 60 cars, containing 60,000 pounds each, contains 1,800 tons, which, at 1.8 mills per ton, makes the gross earnings of the train $3.24 per mile. This is about double the average receipt per train mile for freight, as estimated for the railroads of the United States by the Interstate Commerce Commission; and where the alternative would be to let cars, engines and elevators stand idle this business is no doubt looked upon as giving a very considerable lift to the railroad treasury. And of course a railroad is glad, in hard times, to do business for a very small profit in order to avoid laying off its enginemen, conductors and other trainmen.

Bicycles as Baggage.

In our issue of May 28, page 368, we noted a judicial decision, recently handed down by a Missouri court, denying the application of a passenger on the Missouri Pacific Railway for a mandamus to compel the transportation of a bicycle as baggage on the train with the passenger. This decision was by Judge Henry W. Bond, of the St. Louis Court of Appeals, and was concurred in by the other judges of the Court. As the legislature of Missouri has not passed any law on this subject the decision in question is of no particular account as bearing on the constitutionality of the free-bicycle laws passed in other states; but some of the points of the decision are worth noting neverthless.

For one thing, the judge points out that the right to the carriage of ordinary baggage as a part of the service for which a traveler pays when he buys his ticket "sprang originally from such concessions made by the carrier for the purpose of attracting travel." It is not because there is any inherent justice in carrying a passenger with baggage for the same price that is asked of one who has none at all. Once established, the custom soon became universal and in many states it was crystallized into law. In Missouri the weight required by law to be carried free is only 100 pounds.

The decision cites a number of previous decisions involving the use of streets and the payment of toll, in which bicycles are uniformly held to be vehicles or carriages. And if such a vehicle is baggage why, says the Court, should not the two-wheeled skeleton cart used in training horses, which weighs less than 100 pounds, be included on the same reasoning? Bicycles are smaller and lighter, but, on the other hand, they are more delicately constructed and require more space for the same weight and more care in handling. Again, the law does not recognize a person's clothing or other traveling accessories as baggage, except when they are contained in a bag, box, trunk or other suitable receptacle.

All this reasoning of Judge Bond is so plain as scarcely to need to be stated, but it is well that the subject has been judicially noticed and the true exposition of the facts placed on record. The last point, especially, shows in strong light the absurdity of the provision of the New York law, that the railroad shall not require a bicycle to be crated or otherwise protected.

When long established custom has made a practice universal the courts will uphold a law making it compulsory, however unreasonable the requirement may be from the standpoint of strict equity. An instance of this was the decision of the lawyers composing the Interstate Commerce Commission that railroads in the South should be required to furnish ice for cars carrying strawberries. But the custom of carrying uncrated bicycles free cannot be said to be well-established. If it is right to make it compulsory we shall next hear of a law requiring railroads to keep a certain number of kinds of beer and whiskey in the buffets of dining cars, or to carry a baby-carriage in the passenger car, where the owner can have the benefit of its use while on the road, instead of in the baggage car, where it is liable to become buggy.

On the other hand, though a law requiring the free transportation of bicycles is founded on injustice at every point, the practice is a kind of injustice (to passengers without bicycles) which an increasing number of railroads seem to be glad to employ for the purpose of stimulating travel; and it will not be long, apparently, before all baggage cars will have hooks for hanging wheels where they will least interfere with trunks. How far this stimulation should be carried, is perhaps an unsettled question; but a correspondent of the *Boston Herald*, writing evidently from the impartial standpoint of the space-paid reporter, who is too poor to run in debt for a bicycle, says that railroads not only should encourage bicyclists to patronize their baggage cars for nothing, but should go into the business with much more enthusiasm than has yet been shown anywhere. He would not only carry the bicycles free, but would have for a baggage-man a skillful mechanic, who could inspect and repair the bicyles while they were in his charge; and by way of attracting passengers he would employ the most skillful advertisement-writers to convince wheelmen that the most suitable place for them to go would be some point about 60 miles away from home, where, it is to be presumed, the rider would be sufficiently wearied to return by the cars. If the matter could be controlled within reasonable limits we are not sure but we should be an enthusiastic advocate of this scheme; but it is quite likely that if once the bicyclists get into the habit of taking 60-mile trips frequently, they will appear in the Legislature, 200,000 strong, with a demand to be carried home at a quarter of a cent a mile.

Since writing the foregoing paragraph we have come across an item in the New York papers which may be taken as another straw indicating which way the wind blows. It is a copy of a circular issued by the Long Island Railroad. It does not tell what kind of lubricating oil the baggage men will carry, nor does it state whether the air-pumps carried in the car, for inflating tired wheels, are of the '97 model, but its tone shows that the railroad intends to give wheelmen everything within reason—and perhaps more. It says:

> "H. B. Fullerton is hereby appointed Special Agent of the passenger department, with headquarters at Long Island City. . . . It will be the duty of the special agent to make proper arrangements for the handling of bicycles and the comfort of cyclists; to furnish maps, routes and all information tending to assist cyclists in the selection of roads and stopping places on Long Island, etc. Requests for information, suggestions and complaints addressed to him will receive prompt attention."

A No-Profit Railroad.

We have been informed that the American Railway Company has been incorporated in Iowa; in fact we have received a blank contract, by filling out which we are permitted to subscribe for $10 worth of the capital stock of the company; but we are still in some doubts about subscribing. The list of the incorporators includes the well-known names of Reifsnider, Puckett, Gass and Gue. But we miss the famous Pod Dismuke and Hogg of Texas, and we should be more attracted if the list bore the name of Bloodybridles Wait, that gallant old enemy of greed and gold, whose substitute is said to have shown such valor in our civil war.

Yet the project is enticing. The corporation is formed to build and work a railroad from Council Bluffs, Ia., to Chicago. The amount of the capital stock is to be $5,000,000 in $10 shares, the subscription to be paid in at the rate of $1 every three months, and no stock will be issued until fully paid up either by cash, labor or note. The provision permitting us to pay by labor or note is of itself almost enough to induce us to subscribe; but the great merit of the scheme lies in the provisions against swindling the public. For instance, Article IX. of the articles of incorporation reads: "This railway shall be operated at cost," and from Article X we learn that no stockholder can have more than one vote, no matter how much stock he holds. Furthermore, the corporation is not permitted to incur any interest-bearing debt. The policy of the road is to be subject to revision by the stockholders, and these stockholders "shall exercise their control by what is known as initiative and referendum, calling a special meeting, as provided in Article VIII." Here, we see, the project comes right down to first principles. The railroad will be built and run by mass-meeting and there is no chance for any inflated or autocratic "railroad magnate" to carry on his unchecked career in defiance of the will of the people.

We observe further that the private property of the stockholders shall be exempt from all corporate debt; that no officer shall receive more than $3,000 a year salary, and that the stock of the corporation shall pay no dividend. The prospectus informs us that "public ownership of all public works is, as every intelligent man knows, highly desirable and inevitable, for the very simple reason that the people cannot go on forever paying tribute to an idle, non-producing class." But it does not seem to be easy to bring about this condition which every intelligent man desires, largely, we presume, for the reason that so few of the inhabitants of the United States are intelligent. Therefore the projectors of the American Railway Company will begin the process by running a railroad without profit. They tell us that were there no profit in railroading, such public works would gravitate, naturally, into public control. Doubtless they would, unless there is a radical change in human nature.

We are informed furthermore that "the time has arrived when it is better to speak plainly. God hates a coward anyway, and so do the people." It will be observed that the writers of this prospectus have sources of information as to the Divine mind which are denied to mere worldly profit seekers. Indeed this familiarity with the highest matters seems to be granted to populists and silverites as a special gift, much we suppose as the insane or the idiotic have always been looked upon in rude stages of society as being under the Divine protection and subject to Divine inspiration. For instance, the *Atlanta Constitution* has lately informed us that "God Almighty has fixed the ratio between gold and silver," and that it is useless for the gold bugs to wriggle, for there it will stand eternally. We do not remember whether this Divine ratio is 16 to 1 or 32 to 1, but of course the editor of the *Atlanta Constitution* knows. But to return to the American Railway Company; the timid reader of the prospectus is warned against being bulldozed by the power of monopoly. It is granted that monopoly is powerful and can crush those who seek profit, "but, reader, when we engage in the uplifting of humanity (at cost) monopoly is helpless as a babe. It is off its own dunghill when it attacks the righteous. Animals may sometimes gobble each other up, but they don't live in the sweat of another's face, or try to."

If the reader does not subscribe for ten dollars worth of this stock his heart is indeed hard.

Regret that is almost remorse haunts us whenever we are unable to agree with the Jersey courts on matters of law or equity. Still, we must sometimes rebel, as in the instance of a recent decision in the case of the Trenton Passenger Railroad Company v. Guarantors' Liability and Indemnity Co., wherein the Supreme Court of New Jersey seeks to expound that evasive thing known as "public policy" and refuses to sanction a contract of indemnity, which aims to reimburse a railroad company for damages from loss of life through the casualties of travel. The Court reaches the conclusion that contracts of this character contravene public policy and must be declared void. In general we are shy of "judge made" law, and in particular when dealing with delicate questions of public policy. The Supreme Court of the United States, with the concurrence of the entire bench, has condemned all judicial utterance of the state tribunals on this subject. It reminds the American judiciary that considerations of this character are generally to be dealt with exclusively by the legislative branch of government. "It is a ground much too unstable upon which to rest the interpretation even of a statute." The great Harvard pundit, who is recognized as the controlling authority on the law of contract, has said: "Any thing more indistinct, undefined and incapable of certainty or uniformity than the requirements of public policy can hardly be imagined. It is sometimes made use of as authority in deciding in whatever way the court thinks. But such use of such a principle must greatly diminish the certainty and uniformity of law." We shall assume that the decision of the New Jersey court stands on the theory that an indemnity contract, of the character here mentioned, fosters and invites gross mismanagement and careless supervision on the part of railroad officers, and has a tendency to breed a laxity dangerous to the safety and comfort of passengers. It seems to ignore the fact that the public can invoke the criminal law, which will give such protection as public policy demands and all that a civilized community need give. There is no occasion for the courts to invade the sanctities of contracts. Indemnity bonds of this character have been devised as a salutary and efficient means for equalizing and prorating the burdens attending an unavoidable disaster. An appeal to analogy often leads to results as absurd as those based upon vague assumptions of public policy; but we will venture one. An ordinary savings bank that seeks to indemnify its depositors from loss occasioned through official embezzlement, is clearly within the ban of this decision, which says, in effect, "the universal custom of requiring a bond from the cashier or teller

must be abandoned as obnoxious to public policy, in that such a custom is a direct menace to the integrity of bank supervision. It breeds indifference and carelessness in monetary concerns of vast moment, and is within the special condemnation of this court."

At about 10 o'clock on the evening of June 17, a suburban passenger train of the Chicago, Milwaukee & St. Paul, moving at low speed, ran off the end of the track at the drawbridge at Kinzie street, Chicago, and the engine and the first car, which was a combination smoking and baggage car, fell into the river. The engineman and fireman jumped into the water, and these two with the baggageman and three passengers were injured, but not seriously. It appears that the signals for this drawbridge are of an exceedingly primitive pattern The daylight signal is a long board cut to represent the outline of a fish. When placed in the horizontal position it means stop, and in the vertical position, proceed. The night signal is a lamp showing red and white lights, revolving with the bridge. Both these signals are in the center of the draw, and it is claimed that the signal light was obscured by the smoke of a passing tugboat. Whether the light was or was not visible to the engineman is, however, a minor point; for, of course, it was his duty to make sure that the bridge was closed, even if he had to stop half a dozen times before entering upon the draw; but, as is well said by a correspondent, who gives us the foregoing facts, the popular verdict will be that neither the engineman nor the bridge-tender is much to blame. Signals of such antique design invite disaster. It is not a pressing invitation with a date fixed, but it is one that is pretty sure to be accepted sooner or later. This train had been brought to a full stop, thus complying with the time-honored rule; but the result only goes to prove once more, what Charles Francis Adams showed 25 years ago, that signals, suitably located and interlocked, are not only a complete substitute for the stop, but constitute a safeguard superior to it.

Minnesota has added a new terror to railroading, and especially to the ownership of railroad securities. The Populist has devastated the railroads of that country with his gun and with his jaw, and Nature has apparently done her worst with floods, blizzards and cyclones, but now the very foundations of the railroads are attacked by a new force. The newspapers tell us that a brave and vigilant section foreman on the Great Northern, named Hunter, together with his gang, recently saw "a half mile of the track lifted from the roadbed and thrown into a ditch. In some places the track was thrown six feet from the roadbed and down a steep embankment." The section foreman and his gang apparently were not responsible for the throwing, as they hastened to add that it seems as if some supernatural power had done the work. The newspaper writer says "the weather had been unusually hot, and it is supposed that when the rails were expanded by the heat they were finally lifted and thrown off the ties." There is a certain obscurity in this account, in that we are informed in one sentence that the track was lifted from the roadbed and in another that the rails were lifted from the ties, and we wait with great impatience the arrival of accurate information. Meantime, however, brave Hunter saved a westbound passenger train by running down the track and signaling it, and "the air brakes were put on and the train was stopped within 300 ft. of the gap in the track." Let any incredulous reader remember that Minnesota is the state in which a cyclone blew the door off a locked safe.

TECHNICAL.

Manufacturing and Business.

The Joseph Dixon Crucible Co., of Jersey City, N. J., through its London representative, George W. Wollaston, is now able to successfully compete with European makers of graphite materials. Foreign orders show a steady increase.

At a meeting of the directors of the Continuous Rail Joint Co. of America, held at their office in the Prudential Building, Newark, N. J., June 24, L. F. Braine was appointed General Manager, to succeed the late A. W. Thompson.

The Cook Cooler Co., Ltd., of Flint, Mich., has equipped 150 cars used by Barnum & Bailey's circus with Cook journal coolers.

William Sellers & Co., Inc., 1600 Hamilton street, Philadelphia, Pa., have received an order for a number of their improved injectors, to be applied to locomotives now being built by the Baldwin Locomotive Works for Japan.

The Westinghouse Machine Co., Pittsburgh, Pa., is building a gas engine which will develop 250 H. P.

Willard A. Smith, Old Colony Building, Chicago, has received an order from a Western railroad to equip 200 freight cars with Bettendorf metal body bolsters and Cloud steel trucks, made by the Cloud Steel Truck Co., of Chicago.

The New York Coupler Co., of Cranford, N. J., has been formed by Walter F. Blaisdell, Ira A. McCormick and Joseph W. Blaisdell, of Brooklyn, N. Y.; George F. Whyte, of Jersey City, N. J., and Grove D. Curtis, of Harrington, N. J., to manufacture and deal in car couplers, machinery and tools. The capital stock is $100,000.

Ground has been broken for an addition to the plant of the Garlock Packing Co., at Palmyra, N. Y., which, when finished, will about double the present capacity. The company is now running its factory on extra time in order to promptly fill orders.

Pratt & Letchworth, of Buffalo, N. Y., have received an order from the Brooks Locomotive Works, to furnish castings for three locomotives for Japan. The company recently made a lot of cast-steel locomotive driving wheel centers for the same works, which were thoroughly tested, with satisfactory results.

The Jeffrey Mfg. Co., Columbus, O., has opened an exhibition room at 260 Monadnock Block, Chicago, for showing the working of its chain breast coal-cutting machines and mining drills. These tools are driven by electric motors. George P. Nichols represents the company.

The Missouri, Kansas & Texas Railway recently awarded contracts for a year's supply of 33-in. cast freight and passenger car wheels, dividing the order about equally between the Dickson Car Wheel Co., of Houston, Tex., the St Charles Car Co., of St. Charles, Mo., and the Missouri Car & Foundry Co., of St. Louis, Mo.

The Berlin Iron Bridge Co., of East Berlin, Conn, is furnishing and erecting all the steel framework and covering for the new power-house of the New York & Staten Island Electric Co., at Livingston, S. I. The walls of the building will be brick and the roofs have steel trusses covered with corrugated iron. The roofs are arranged with suitable monitors with skylights for light and ventilation. On the building is a large wire tower of steel construction. The engine-room is arranged for a traveling crane of 13 tons' capacity. The building has been built with the idea of having it absolutely fireproof. The roof of the engine and dynamo portions of the building is lined underneath the corrugated iron with the Berlin Iron Bridge Co's anti-condensation fireproof roof lining

At the annual meeting of the Westinghouse Electric & Mfg. Co., held at Pittsburgh, Pa., June 23, the following Board of Directors was elected: Charles F. Adams, Lemuel Bannister, August Belmont, N. W. Bumstead, A. M. Byers, Marcellus Hartley, George W. Hebard Henry B. Hyde, Brayton Ives and George Westinghouse. It was announced at the meeting that on June 19 the company was awarded a contract to furnish 15 5,000-H. P. generators for the plant of the St. Lawrence Construction Co. at Massena, N. Y. This involves about $750,000. The Westinghouse Electric & Mfg. Co. is now building five generators for the same company.

The Siemens-Halske Electric Co., of Chicago, with a capital stock of $700,000 of preferred and $1,275,000 of common shares, and the Pennsylvania Iron Works, of Philadelphia, with a capital of $1,750,000 of 6 per cent. non-cumulative preferred and $1,500,000 of common stock, have combined, with a capital of $3,250,000 for the purpose of manufacturing all kinds of machinery for electric street railroads. The Siemens-Halske Electric Co. was incorporated about three years ago as a branch of the electrical machinery firm of Germany bearing that name, and later bought the plant of the Grant Locomotive Works and fitted it up to manufacture dynamos and electrical machinery as well as both steam and electric locomotives. The Pennsylvania Iron Works manufactures engines and different kinds of machinery as well as machinery for street railroads. We understand that the present plans of the combined companies are to manufacture the electrical machinery in Chicago and the other materials used to build electric street railroads, in Philadelphia. At the annual meeting of the Siemens-Halske Electric Co. in Chicago last week, the following directors and officers were elected: Charles T. Yerkes, Chicago; W. L. Elkins, Jr., Philadelphia; R. Suydam Grant, New York; Charles E. Yerkes, Chicago; B. W. Grist, Philadelphia; F. W. Whitridge, New York; W. T. Butler, New York; E. T. Rice, Jr., New York; Martin Maloney, Philadelphia. The new members of the Board are C. T. Yerkes, W. L. Elkins, Jr., and B. W. Grist. The President is Charles E. Yerkes; Vice-President and Treasurer, W. F. Furbeck; Assistant Treasurer and Assistant Secretary, William T. Block; Secretary, F. B. Badt, and General Manager, B. W. Grist. The President of the company is the son of Charles T. Yerkes. Mr. Furbeck is the Treasurer of the West Chicago Street Railway.

Iron and Steel.

The East Lebanon (Pa.) Iron Co. resumed work in all departments on June 21 on double time.

At a recent meeting of the stockholders of the Buffalo Furnace Co., of Buffalo, N. Y., Directors were elected as follows: C. C. Bolton, L. C. Hanna, F. B. Richards, A. S. Hubbell and F. E. Bachmann.

Owing to a reduction in wages at the Lackawanna Iron & Steel Works, at Scranton, Pa., the entire south mill of the company, including the rail mill, has been closed, the men having refused to accept the cut.

At the annual meeting of the Burden Iron Co., of Troy, N. Y., the following trustees were elected: James A. Burden, I. Townsend Burden, John L. Arts, James A. Burden, Jr., and Nicholas J. Gable. The trustees then elected these officers: President, James A. Burden; General Manager, John L. Arts; Secretary, Nicholas J. Gable.

It is reported that the new basic open-hearth plant of the Buhl Steel Co., at Sharon, Pa., which was recently put in blast, is giving satisfactory results. A large part of the equipment of this plant was furnished by the Lloyd Booth Co., of Youngstown, O.

New Stations and Shops.

The Atchison, Topeka & Santa Fe proposes building a new roundhouse at Newton, Kan., to accommodate 23 engines. The turntable at that place is to be rebuilt and enlarged to 60 ft.

The Charlestown & Western Carolina will build a new freight depot in Augusta, at the foot of Campbell street The new building, which will be 300 × 50 ft., is to be finished by September.

A Steam Garbage Scow for New York.

The New York Street Cleaning Department has recently put in service the first of the three steam-propelled dumping scows ordered for it. The boat was built at the Crescent Ship Yard, Elizabethport, N. J., from the design of Lieutenant-Commander Delahanty. The scow is built with two steel hulls, each divided into eight watertight compartments. Each hull is 136 ft. long, 8 ft. wide and 10 ft. deep, and of a general oval section, something like a whale back. Between the hulls is a rectangular dumping box, which is divided by transverse partitions into six separate pockets. The sides of the dumping pockets rise 8 ft. above the decks of the hulls, giving a total depth of 18 ft. to the dumping space. The bottom of each pocket is formed of a pair of doors hinged to the side walls of the pocket and opening downward from a horizontal position at the center. These doors are kept closed by chains wound on drums on a horizontal shaft running alongside the pockets on the platform deck. The doors are opened and closed by a 10 H.-P. engine, which by means of a vertical shaft and gears drives the horizontal shaft. The drums, which are opposite the pockets, are operated by multiplying gears controlled by friction clutches. The doors are held shut by compressor blocks worked by hand wheels. The pockets have a capacity of about 600 cu. yds. Each hull is provided with a 125 H.-P. engine with its propeller and a rudder. Both rudders are, however steered by a single wheel in a pilot-house back of the dumping space. The boilers, quarters for the crew, tanks, etc., are in the hulls

Locomotive Tests on the Illinois Central.

Prof. L. P. Breckenridge, head of the Department of Mechanical Engineering, University of Illinois, has just completed, with the assistance of Prof. W. H. Vandervoort and students in the University, road tests of three Illinois Central locomotives, using one of the new 18-in. ×26-ft eight-wheel passenger engines, a 19-in. ×26-in. mogul freight engine and a 21 in. ×24-in. consolidation locomotive. Indicator cards were taken at frequent intervals and all the necessary observations were made for complete engine and boiler tests.

Mississippi River Improvements.

The Mississippi River Commission, which was in session last week in New York City, has apportioned the entire amount of $2,933,033, which was appropriated by Congress for improvements to the Mississippi River. Four hundred thousand dollars will be spent in dredging, $2,000,000 for building and rebuilding levees, and the remainder, $533,033, for general expenses of the Commission in preserving the banks and revetments. The apportionment for the various districts are as follows: Lower St. Frances, $77,325; Upper Yazoo, $88.825; White River, $150.000; Upper Tensas Basin, $364,400; Lower Yazoo, $675,929; Palmyra, $5,000; Lower Tensas, $278,350; Atchafalya, $168,750: Lafourche, $50,625; Pontchartrain, $137,675; Lake Borgne, $2,700, and Barataria, $23,625. Bids for contracts will be advertised for at once and plans and specifications will be prepared. The work will be under the supervision of the army engineers, and none of the money will be spent by the local authorities of the districts to which it is apportioned. The report of the Commission will not be made public until after it has been submitted to the Secretary of War. Col B. Gillespie, Army Building, New York City, is President of the Commission.

The Boston Terminal Station.

At the new terminal station at Summer street, Boston, Superintendent Charles J. Clark now has a force of 600 men at work excavating. This number will be increased to 900 by the middle of July. There are 25 steam engines furnishing power and 20 derricks, making the site look like a quarry, and nine pile-drivers. A person who attempts to walk around this big cellar has a journey of just a mile to perform. The particular portion being excavated at preset is the subway loop to be used by suburban trains. Between 400 and 500 piles a day are being driven.

Interlocking at the Boston Terminal.

The Boston Terminal Co. has awarded to the Union Switch & Signal Co. the contract for putting in the necessary switches and electro-pneumatic interlocking and block signals at the new Union passenger station in Boston. It is said that the contract amounts to about $120,000.

Westinghouse Contracts at the Boston Terminal.

The Boston Terminal Co. has awarded to Westinghouse, Church, Kerr & Co., acting for itself and the other Westinghouse companies, contracts for the equipment of the new terminal station, with apparatus for power, heat, light, refrigeration and ventilation; and the signaling, already noted in another item in this paper is to be done by another Westinghouse concern, the Union Switch & Signal Co. The distribution of the work between the chief contractors and the other companies—the Westinghouse Electric Co. and the Westinghouse Machine Co.—has not yet been made public. It is said that the total cost of the work to be done will be about

$500,000, which, presumably, does not include the signaling proper, the cost of which has been stated as $120,000.

A Big Electric Contract.

The annual report of the Westinghouse Electric & Manufacturing Co., issued under date of June 23 says that that company has just made a contract for fifteen 5,000-H. P. generators for the St. Lawrence Power Co., "which is the largest single order ever given for power transmission apparatus." The Westinghouse Company put in the first three 5,000-H. P. generators for the Cataract Construction Co. at Niagara Falls, and in January of 1897 made a contract to furnish five additional generators of the same capacity, which are now building. These great orders place the Westinghouse Company at the head of the business in the design and building of heavy power transmission machinery.

New York and New Jersey Bridges.

Judge Advocate General Lieber, of the army, has made a report to the Secretary of War, in which he holds that the New York & New Jersey Bridge companies have not forfeited their right to bridge the Hudson, owing to the fact that all plans and specifications have not yet been approved by the Secretary, although the year's limit, within which the building was to have been begun, has expired. The Chief of Engineers held that the Secretary had no right to approve the change of plans under the new harbor rules, as the time limit had expired; but this decision, if upheld, will give the company a chance to have its plans approved.

THE SCRAP HEAP.

Notes.

The Court of Errors and Appeals of New Jersey has sustained the United States Pipe Line Co., in its protracted suit against the Delaware, Lackawanna & Western to establish the right to lay a pipe beneath the railroad company's track at Washington, N. J. The pipe is part of a line for the conveyance of oil from the Pennsylvania wells to the Atlantic seaboard.

Among the optimistic statements that have been published in the newspapers concerning the Sonora Railroad, since it was sold by the Atchison to the Southern Pacific, is one to the effect that extensive anthracite coal deposits exist in that part of Mexico; but an officer of the Southern Pacific informs us that diligent inquiry has failed to show any reliable foundation for this report.

The State Railroad Commissioners of New York threaten to take action in the courts to stop the running of trains on the Lebanon Springs Railroad, 50 miles long, from Chatham, N. Y, to Bennington, Vt., unless the Receiver makes extensive repairs to the track. Mr Gatchell, the inspector for the Commissioners, has lately examined the road and reports it in a very bad condition.

Court No. 2 at Philadelphia has sustained the demurrer of the Pennsylvania Railroad in the suit against that company by Edward Wolf and others to compel an accounting of car service charges paid by the Philadelphia & Erie to the Pennsylvania road in 1895. Plaintiffs are stockholders in the Philadelphia & Erie and complain that the Pennsylvania, lessee of the road, in charging the P. & E. $378,276 for car service in the year mentioned has been unfair to the leased road, reducing its net earnings to an extent not justified by the lease. The demurrer now sustained set up that the complainants were not in a position to be legally afforded the relief they sought, and that the bill was insufficient in law.

Mrs. Chesley, widow of the late Harry B. Chesley, Division Superintendent of the Boston & Albany, at Boston, who died on May 30, has received from the railroad company a gift of a sum of money equal to one year's salary of her late husband. From a number of notices that we have seen in Massachusetts papers we conclude that the giving of gratuities of this kind has become a somewhat settled thing with the Boston & Albany, not only in the case of officers and employees dying in the service, but also in the cases of faithful employees retiring on account of old age. Among the beneficiaries that we have noted are shop carpenters, section masters, station agents, roadmasters and men in other departments.

On the night of June 22 the express car of a passenger train on the Louisville & Nashville was robbed near Clarksville, Tenn., by a robber who boarded the train at a station. He succeeded in getting some money from the express car and stopped the train and got away before an alarm was given. On June 26 J. W. Pond, a cattleman riding on a passenger train of the Burlington road, was shot by train robbers as the train was approaching Omaha. It appears that Pond prepared to get off the train near the stockyards just as the robbers, six of them, were preparing to go through the train, and that his movements frustrated their plans. The shot aroused the passengers and the robbers fled. A freight conductor and a brakeman were shot by negro tramps near Charleston, W. Va., and the injuries of both men were pronounced fatal. A similar, though less serious, outrage was recently reported from Westfield, Mass.

Bridge Disasters.

On the evening of June 26, about seven o'clock, an express train of the Wabash road broke through a bridge near Missouri City, Mo., which had been weakened by a flood, and the tender and first three or four cars fell into the water. The baggageman, one brakeman and five postal clerks were killed, most of them being drowned, and the conductor and 10 passengers were injured. It appears that there had been a very unusual fall of rain for about two hours before the accident. The wreck of a highway bridge, floating down stream, was lodged against the railroad bridge, causing it to be pushed out of place. It is said that a farmer discovered the weakened condition of the bridge and attempted to stop the train, but failed to draw the attention of the engineman.

A press dispatch of June 27 reported a disaster similar to the above near Kolomea, in Galicia, Austrian Poland. Eight or more passengers were drowned.

Sunday Steamboat Excursions in Massachusetts.

The Massachusetts State Railroad Commissioners are now giving a good deal of attention to the question of Sunday steamboats. The People's Steamboat line, of Fall River, petitioned for the right to run Sunday trips to Crescent Park, near Providence, and several hearings have been held on the question. On June 24 there was a hearing on the petition of the Providence, Fall River & Newport line for the right to run from Fall River to Newport and Block Island, a trip of 3½ hours. Both hearings were continued to July 8, thus spoiling the plans of the companies for running on Sunday, July 4. At the last hearing Commissioner Sanford stated that a man had applied for the right to run a boat on Sunday from Fall River to Mount Hope, across the bay, and that the decision of the whole question would be postponed until he, too, had been heard. There are also petitions from a Salem steamboat company for a like permission, so that it may be well into the summer before any decision is reached.

The Seoul-Chemulpo Railroad in Korea.

Counsel-General Sill has recently stated that work on the Seoul-Chemulpo Railroad has been begun and is progressing favorably. The concession for this road, which is to extend from Seoul, the capital of Korea, 25 miles west to Chemulpo, its port, was granted to Mr. James R. Morse, President of the American Trading Co., 182 Front street, New York City, on March 29, 1896, with the approval of Russia and the tacit consent of Japan. A history of the enterprise and of certain other railroad projects in Korea was given in the *Railroad Gazette* of March 12, 1897. The concession is for 25 years, at the end of which time the Korean government may buy the road on appraisement.

LOCOMOTIVE BUILDING.

The Pecos Valley is reported in the market for some locomotives.

The Lehigh Valley Railroad has finished building at its Hazleton shops a new passenger locomotive.

Three or four private narrow-gage roads in Russia have recently sent out specifications for some new locomotives. The number required by each is small.

We understand that the Lake Shore & Michigan Southern will soon place an order for the five switching engines, for which it has been in the market for some time past.

The Rogers Locomotive Co. of Paterson, N. J., has received an order to build one four-wheel locomotive for the New Jersey & Pennsylvania Concentrating Works, of Edison, N. J., with 12 × 18 in. cylinders.

The Mexican Central has placed an order with the Brooks Locomotive Works for 10 ten-wheel passenger locomotives, with 19 × 24-in cylinders, and 10 consolidation locomotives, with 21 × 16-in. cylinders.

The Brooks Locomotive Works have delivered to the Chicago, Indianapolis & Louisville two passenger engines American type, with cylinders 18½ in. × 24 in; also two 6-wheel switching engines with cylinders 18 in. × 24 in.

The Buffalo, Rochester & Pittsburgh has ordered two 10-wheel passenger engines, with 18 × 24-in. cylinders, one from the Dickson Mfg. Co., of Scranton, Pa., and the other from the Brooks Locomotive Works, of Dunkirk, N. Y.

CAR BUILDING.

The New York, Ontario & Western is about to order 10 passenger cars.

The Chicago, Milwaukee & St. Paul is reported in the market for 40 furniture cars.

The Southern Railway is having one passenger car built by the Ohio Falls Car Mfg. Co.

The order for 400 cars for the Mobile & Ohio, referred to in our last issue, includes 200 coal and 200 box cars.

The Grand Rapids & Indiana has finished building at its shops in Grand Rapids, Mich., 12 new passenger cars.

The Mt. Vernon Car Mfg Co., of Mt. Vernon, Ill., is building two freight cars for the Southwest Millers' Dispatch.

The Barney & Smith Car Co., of Dayton, O., is building one passenger car for the Ogdensburgh & Lake Champlain.

The Mexican Central has placed an order with the Michigan-Peninsular Car Co., of Detroit, Mich., for 475 freight cars.

The Interoceanic Railway of Mexico is having 20 freight cars built by the St. Charles Car Co., of St Charles, Mo.

The Terre Haute Car Mfg. Co., of Terre Haute, Ind., is building two freight cars for the Live Poultry Transportation Co.

The Kansas City, Pittsburgh & Gulf Railroad has ordered 200 coal cars of 60,000 lbs. capacity from the Pullman Palace Car Co.

The Youngstown Bridge Co., of Youngstown, O., has just finished building a steel car for the Pittsburgh & Lake Erie Railroad. It is 31 ft. long and weighs 35,000 lbs. with a capacity of 100,000 lbs.

In addition to the order for one passenger car for the Des Moines & Kansas City, referred to in our last issue, the Pullman Palace Car Co. will build for the same road one additional coach and one combination baggage and mail car.

The Pittsburgh, Cincinnati, Chicago & St. Louis is building at its Columbus, shops, one combination mail and baggage car for the Cleveland & Marietta road and three 60-ft. baggage cars and five combination baggage and passenger cars for use on its own line.

The Cincinnati, Portsmouth & Virginia has placed an order with the Ohio Falls Car Mfg. Co., of Jeffersonville, Ind., for 50 flat cars of 60,000 lbs. capacity. These will be equipped with Tower couplers, New York air-brakes, diamond trucks and combination truss brake-beams.

BRIDGE BUILDING.

Albany, N. Y.—Bids are asked by the Board of Contract and Apportionment, July 6, for the steel superstructure of a viaduct on the line of Knox street between Central avenue and Canal street. Blank proposals, specifications and information regarding the work may be obtained at the office of the Board. T. J. Lanahan, Clerk.

The Board asks for bids, on July 6 also, for the masonry substructure, including abutments and pedestals for the same bridge.

Binghamton, N. Y.—Bids are asked until July 12 for a bridge across the Chenango River, at Ferry and De Forest streets, in accordance with plans made by the City Engineer, and to be seen at the City Clerks' office. Burr W. Mosher, City Clerk.

Boston, Mass.—The Board of Railroad Commissioners has had a hearing on the petitions of the town of Watertown and the city of Cambridge to be allowed to rebuild and widen the bridge over the Fitchburg Railroad, known as the Mt. Auburn street bridge. As the railroad interposes no objection to the petition, it will be allowed.

Haverhill, Mass.—The Railroad Commissioners have approved the plans made by A. Ames, Jr., for a bridge by which the Haverhill & Georgetown Street Railway will cross the railroad. The bridge will be a wooden structure 700 ft. long.

Jackson, Miss.—The Alabama & Vicksburg is said to be preparing to build a steel bridge over Pearl River near this city.

Melita, Man.—Tenders are being asked by W. F. Thomas, Secretary-Treasurer, for a single-span bridge.

New York.—Prof. Wm. H. Burr has submitted specifications for borings to be made in connection with the proposed viaduct on the Riverside Drive at Eighty-sixth street. The building of this viaduct was decided upon several months ago. When it is completed the dip in the Drive at Eighty-sixth street will be removed.

Norristown, Pa.—The Court has appointed a jury to take action on the petition to have a county bridge built over Saw Mill Run on Airy street, from Arch to Green.

Orangeville, O.—The Commissioners of Mercer County, Pa., and Trumbull County, O., will receive bids, at this place, on July 8, for the superstructure of an iron bridge at this point. Bridge to have a 97-ft. clear waterway and 18-ft. roadway, and be designed to carry a rolling weight of 125 lbs. to the square foot, with a factor of safety of four.

West Seneca, N. Y.—The Town Board has passed a resolution authorizing the Lake Shore & Michigan Southern to cross under the Ridge road with its main and yard tracks, the railroad to build a steel bridge on a plan to be approved by the Town Board, continuing the Ridge road over the tracks as laid out. The driveway of the bridge is to be 30 ft. wide, with a footpath for passengers 6 ft. wide on the north side.

Westwood, N. J.—Bids are asked July 8 for a bridge of steel beams and brick arches, on stone abutments, near Hillsdale Station. John A. Eckerson, Chairman of Commissioners.

Zanesville, O.—Bids are asked until July 20 for the iron or steel work of a 120-ft. bridge across Jonathan's Creek, near Fultonham. James L. Starkey, County Auditor.

MEETINGS AND ANNOUNCEMENTS.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Chicago, Rock Island & Pacific, 50 cents per share, payable Aug. 2.

Delaware, Lackawanna & Western, 1¾ per cent. on the capital stock, payable July 20.

Denver & Rio Grande, 1 per cent. on preferred stock, payable July 15.

Little Schuylkill Navigation, Railroad & Coal Co., $1.25 per share, payable July 9

Maine Central, quarterly, 1½ per cent., payable July 1.

Rutland, 1 per cent. on preferred stock, payable July 1.

Stockholders' Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Montana Central, annual, Helena, Montana, July 26.

New Orleans & Southern, annual, New Orleans, La., July 13.

Southern Pacific of Arizona, annual, cor. Post and Montgomery streets, San Francisco, Cal., July 14.

Technical Meetings.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *American Society of Railroad Superintendents* will hold its next meeting at Nashville, Tenn., beginning Sept. 22.

The *American Street Railway Association* will hold its sixteenth annual convention in Convention Hall, Niagara Falls, Oct. 19-22, 1897.

Western Railway Club.

At a meeting of the Board of Directors of the club, held in Chicago June 25, Mr. F. M. Whyte was elected Secretary for the ensuing year.

Western Society of Engineers.

The next meeting of the Western Society of Engineers will be held Wednesday evening, July 7, in the Society rooms, Monadock Block, Chicago. Prof. Arthur N. Talbot, of the University of Illinois, will read a paper on "Limestone Screenings in Cement Mortar."

Civil Engineers' Club of Cleveland.

A regular meeting of the Civil Engineers' Club of Cleveland was held in the Case Library Building, Tuesday evening, June 8. Mr. Charles W. Hopkinson presented a paper on "The Philosophy of Architecture," taking up the subject under the following heads: First, the philosophical development of the desires of the people for structures; second, the intimate relation of the people to the resulting architecture; third, the development of the actual problem between client and architect. A discussion of the paper followed in which Messrs. Searles, Barnum, Warner, Herman and others took part

PERSONAL.

—Mr. T. H. King, Vice-President of the Sherman, Shreveport & Southern, was drowned while bathing at Greenville, Tex., June 16.

—Mr. R. W. Hockaday has been appointed Traveling Freight Agent of the Missouri, Kansas & Texas, with headquarters at Kansas City.

—Mr. C. A. Waterman has been appointed Commercial Freight Agent of the Missouri Pacific, with headquarters at San Antonio Tex., to succeed Mr. Homer Eads, resigned.

—Mr. William J. Mullin has been appointed Soliciting Freight Agent of the Philadelphia & Erie, with headquarters at Scranton, Pa., to succeed Mr. Gilbert H. Cobb, promoted.

—Mr. Edward B. Ellicott, formerly Superintendent of Construction for the Western Electric Co., has been appointed City Electrician of Chicago, succeeding Mr. John P. Barrett.

—Mr. R. D. Wade, who resigned as Superintendent of Motive Power of the Southern Railway in January of last year, has been appointed Southern Representative of the Baldwin Locomotive Works.

—Mr. N. A. Stedman, of Fort Worth, Tex., has been appointed General Attorney for the International & Great Northern, with headquarters at Tyler, Tex., to succeed Mr. John M. Duncan, resigned.

—Mr. S. R. Ainslie, heretofore General Manager of the Chicago & Northern Pacific and the Chicago & Calumet Terminal, has been elected President and General Manager of the Chicago Terminal Transfer Co.

—Mr. Thomas L. Greene, the well-known writer on railroad and financial topics, and Auditor of the Manhattan Trust Co., has been elected President and Treasurer of the Oregon Improvement Co.

—Mr. M. B. Waller, heretofore Secretary of the Port Jervis, Monticello & New York, has been appointed General Superintendent of that road, with headquarters at Port Jervis, N. Y., to succeed Mr. S. D. Lake, resigned.

—Mr. Isaac B. W. Dutcher, Southwestern Agent of the Rome, Watertown & Ogdensburgh and of the Ontario Dispatch, with headquarters at St. Louis, Mo., died at that place on June 23 of pneumonia. Mr. Dutcher was 51 years old.

—Mr. W. M. Stephenson, heretofore Contracting Agent of the Wisconsin Central lines, with headquarters at Duluth, Minn., has keen appointed General Agent of the company, with headquarters at the same place, to succeed Mr. F. A. Greene.

—Mr. G. R. Hackley, heretofore Chief Clerk of the Traffic Department of the Mexican International, has been appointed Commercial Agent, with headquarters at the City of Mexico, to succeed Mr. A. L. Roby, resigned to accept service elsewhere.

—Mr. William L. Winans died at London, England, on June 25, aged 75 years. Mr. Winans was a son of the late Ross Winans, of Baltimore, Md , and was a member of the celebrated Winans firm which made a great fortune in railroad building in Russia.

—Mr. F. M. Whyte has been appointed Mechanical Engineer of the Chicago & Northwestern Railway, to take effect July 1. Mr. E. B. Thompson, formerly Mechanical Engineer of the Northwestern, accepted a similar position on the Northern Pacific several months ago.

—Mr. D. C. Prescott, heretofore Assistant General Freight Agent of the Boston & Maine, with headquarters at Concord, N. H., has been appointed General Freight Agent of the Maine Central, with headquarters at Portland, Me., to succeed Mr. Woodman S. Eaton.

—Mr. M. Okana, Traffic Manager of the Japanese Government railroads, is now on his way East to study the freight and passenger traffic of the railroads of the United States He will spend several months in this country and then proceed to Europe on a similar mission.

—Mr. D. D. Byers, who has been appointed Acting Auditor of the Columbus, Sandusky & Hocking under the receivership, to succeed Mr. A. W. Dunning, was only a short time before his appointment made Chief Clerk in the Auditing Department, to succeed Mr. W.D. McKinney.

—Mr. W. S. Whitney, Auditor and Car Accountant of the Evansville & Terre Haute, with headquarters at Evansville, Ind., has resigned, and will be succeeded by Mr. T. J. Hyman, at one time Auditor of the Wisconsin Central and later Assistant to the President of the Great Northern.

—Mr. M. J. Hanly, of Toronto, has been appointed Manager of Construction of the new Crow's Pass road by the Canadian Pacific. Mr. Hanly has for many years been connected with railroad building in Canada, having had charge of the construction of several sections of the Canadian Pacific.

—Mr. M. J. Bissell, formerly Passenger Agent of the Oregon Railroad & Navigation Co., at Spokane, has been appointed General Puget Sound Agent for the company, with headquarters at Seattle, Wash., to succeed Mr. E. E. Ellis, who was recently appointed General Agent of the Oregon Short Line at Portland, Or.

—Mr. Leon H. Hart, formerly Receiver of the Texas, Sabine Valley & Northwestern, died at Longview, Tex., on June 22, after an illness of several months. Mr. Hart was appointed Receiver of the Texas, Sabine Valley & Northwestern on Sept. 20, 1893, and held that office until July, 1896, when he resigned on account of ill health.

—Mr. Joseph Biggs, formerly Traveling Passenger Agent of of the Illinois Central, with headquarters at Cincinnati, O., has been appointed Joint Agent at Chicago for the new Chicago-Washington Line formed by a combination of the Louisville, New Albany & Chicago, Cincinnati, Hamilton & Dayton and the Baltimore & Ohio Southwestern roads to succeed Mr. Perry Griffin.

—Mr. F. H. Kingsbury, Eastern Superintendent of the Star Union Line (of the Pennsylvania Lines, has resigned on account of ill health, and has been succeeded by Mr. George T. Smith, for many years Agent of the Star Union Line in New York City. Mr. Kingsbury will continue to serve on one or more committees of the freight department of the Pennsylvania. He has only recently returned from California, where he spent the winter endeavoring to recuperate.

—Mr. H. F. McFarland, heretofore General Freight and Passenger Agent of the Galveston, Houston & Henderson, at Galveston, Tex., has been appointed Commercial Agent of the Missouri, Kansas & Texas, with headquarters at St Louis, Mo., to succeed Mr. R. H. Vaughan. Mr. McFarland was also Joint Agent for the Galveston, Houston & Henderson, the International & Great Northern and Missouri, Kansas & Texas at Galveston, and will be succeeded in that office by Mr. F. A. Lister, recently in the employ of the Union Pacific, Denver & Gulf.

—Mr. Joseph P. Thompson died at his home in Orange, N. J., on June 28, after a long illness. Mr. Thompson was born Dec. 20, 1844, at New Haven, Conn., and entered railroad service in 1872 as clerk in the general freight office of the Chicago, Burlington & Quincy. In 1875 he was appointed General Freight and Passenger Agent of the Atchison & Nebraska, and on July 20, 1878, Agent of the New York, Lake Erie & Western at Newark, N. J., holding that position until 1886, when he was made Division Freight Agent of the Eastern and Delaware divisions of that road. On Jan 1, 1889, he was appointed General Freight and Passenger Agent of the Buffalo, Rochester & Pittsburgh, which office he held until his resignation in 1892.

—Mr. W. H. Lewis, Master Mechanic of the Chicago, Burlington & Northern, has resigned to accept the position of Superintendent of Motive Power of the Norfolk & Western, with headquarters at Roanoke, Va., to succeed Mr. H. R. Soule, resigned. Mr. Lewis was born at Syracuse, N. Y., Oct. 18, 1845, and at the age of 16 years became a machinist's apprentice in the shops of the New York Central. Three years later he went to the Chicago, Burlington & Quincy as a machinist, and afterward served four years as machinist and four years as a locomotive engineer on the Hannibal & St. Joseph. In 1873 he was made Master Mechanic of the Northern Pacific, where he remained for five years, afterward filling successively the positions of Division Foreman of the Kansas Pacific, Master Mechanic of the Oregon Short Line and of the Western Division of the New York, Chicago & St. Louis. He has been Master Mechanic of the Chicago, Burlington & Northern since December, 1888.

—Mr. R. H. Soule, General Superintendent of Motive Power of the Norfolk & Western Railway, is reported to have resigned that office to take employment with a locomotive works. During the conventions at Old Point Comfort this story, with a great many other probable and improbable ones, was in more or less circulation and quite specific reasons were given for Mr. Soule's resignation. We have, however, refrained, as a matter of course, from giving it any wider publicity until it is pretty well authenticated, at least in so far as that he has resigned. We cannot learn that he has made definite arrangements for the future. We have watched Mr. Soule's career with care and attention for more than 20 years, and can say with confidence that the railroad company which loses his services from any position whatever is unfortunate, and that any railroad or other company which secures his services in any position which he will consent to try to fill is fortunate.

ELECTIONS AND APPOINTMENTS.

Chicago Terminal Transfer Co.—On June 23 the Directors of the company elected the following officers; President and General Manager, S. R. Ainslie; Vice-President, F. F. Gates; Secretary, George P. Butler; Executive Committee, Edward D. Adams, Chairman, F. F. Gates, A. S. Heidelbach, A. L. Hopkins and Colgate Hoyt.

Columbus, Sandusky & Hocking.—Receiver Felton has appointed D. D. Byers Acting Auditor, to succeed A. W. Dunning, Auditor, resigned.

Duluth, Missabe & Northern.—J. T. McBride has resigned as First Vice-President, but will continue as General Manager of the road. William J. Olcott has been elected First Vice-President, to succeed Mr. McBride and will have charge of the freight and passenger departments.

Grand Trunk.—Joseph Hobson, Chief Engineer of the road, having been assigned the entire charge of the building of the Victoria Jubilee Bridge, the immediate supervision of the maintenance of track, buildings, water stations and wooden bridges has been placed under the jurisdiction of the Superintendents of the respective divisions, who will report to the General Superintendent, Mr. F. H. McGuigan. Mr. Hobson will continue in charge of the St. Clair Tunnel, all iron bridges, masonry and signals and interlocking, and will also have the direction and supervision of all contract work, the preparation of plans, specifications and estimates for new work, and the custody of original maps and profiles of the roads comprising the Grand Trunk System.

Logansport & Indianapolis.—At the annual meeting of stockholders, held at Logansport, Ind., on June 21, the following Directors were elected: E. G. Cornelius, N. S. Byram, N. E. Davenport, W. E. Lybrook, A. H. Hardy, J. T. Elliott, W. A. Osmer, Q. A. Myers and E. N. Talbott. The board elected E. N. Talbott President, N. S. Byram First Vice-President, W. E. Lybrook Second Vice-President, E. G. Cornelius Treasurer and Q. A. Myers Secretary.

Maine Central.—At a meeting of the directors, held at Portland, Me., on June 26, D. C. Prescott was elected General Freight Agent, to succeed Woodman S. Eaton, resigned. Mr. Prescott's headquarters will be at Portland, Me.

New England.—The offices of Secretary and Treasurer of the Norwich & Worcester and Treasurer of the Norwich & New York Transportation Co., in Norwich, Conn., have been abolished, and the duties of those offices will hereafter be performed at the Boston office of this company. M. M. Whittemore, who formerly held the above-named offices, will remain in the employ of the company.

Oregon Improvement Co.—At the annual meeting of stockholders, held at Portland, Or., on June 23, the following Directors were elected: Thomas L. Greene, New York; William S. Ellis, Pennsylvania; W. O. Jones, New York, and C. A. Dolph, Henry Failing, William M. Ladd, Joseph Simon, William M. Mackintosh, A. L. Mills, Richard Nixon and C. F. Adams, of Oregon. The board organized by electing the following officers: President and Treasurer, Thomas L. Greene; Vice-President, C. A. Dolph; Secretary, N. Poston; Executive Committee, Thomas L. Greene, W. O. Jones and William S. Ellis.

Pittsburgh, Connellsville & Baltimore.—The directors of this company, recently incorporated in Pennsylvania, are as follows: R. E. Murdock, Ingram, Pa., President; John G. Hosick, Springdale, Pa.; Charles W. Stoup, Natrona, Pa., and Selwyn M. Taylor. H. J Lewis, W. E. Fohl and James Donaldson, all of Pittsburgh.

Rochester & Genesee Valley.—At the recent meeting of stockholders, held at Rochester, N. Y., the following Directors were elected for the ensuing year: James Brackett, Josiah Anstice, Haywood Hawks, E. F. Brewster, W. N. Cogswell and F. P. Allen.

Sioux City & Northern.—At the recent annual meeting at Sioux City, Ia., officers and Directors were elected for the ensuing year as follows: President, S. J. Beals; Vice President, A. F. Call; Secretary and Treasurer, H. S. Baker; Directors, A. F. Call, H. S. Baker, W. P. Clough, J. F. Stevens, F. C. Hills, F. A. Seaman, S. J. Beals, G. W. Oakley and W. P. Manley.

South Alabama & Gulf.—Officers of this company, recently incorporated in Alabama, have been elected as follows: President, W. H. Parrish; Vice President and General Manager, W. B. Gilmer; Treasurer, J. F. Thames; Secretary, R. D. Porter; Attorney, J. C. Richardson.

Southern.—The operating divisions of the road have been rearranged, and some sub-divisions made, and instead of being known as the first, second, etc., divisions, will, after July 4, be named as follows: Washington Division—Washington, D. C., to Monroe, Va , Alexandria Branch, Round Hill Branch, Harrisonburg Branch, Warrenton Branch and Monroe Yard; E. Ryder, Superintendent, Charlottesville, Va. Norfolk Division—Monroe, Va., to Spencer, N. C., Greensboro to Goldsboro, Selma to Pinners Point, University Branch, Wilkesboro Branch, Mocksville Branch, Ashboro Branch and Factory Branch; N. J. O'Brien, Superintendent, Greensboro, N. C. Charlotte Division—Spencer, N. C., to Greenville, S. C., Spartanburg to Biltmore, Norwood Branch, Taylorsville Branch, Spencer Yard and Greenville Yard; W. B. Ryder, Superintendent, Charlotte, N. C. Atlanta Division—Greenville, S. C., to Atlanta, Ga., Elberton Branch, Roswell Branch, Atlanta to Fort Valley, Atlanta to Ooltewah Junction, Rome to Attalla, Cleveland to Cohutta, Atlanta Belt R. R., and Atlanta Yards; W. A. Vaughan, Superintendent, Atlanta, Ga. Birmingham Division—Austell, Ga., to Greenville, Miss., Henry-Ellen Branch, Woodlawn to Bessemer, North Birmingham-Coalburg Loop, Coalburg Branch, Brazil Branch, Blossburg Branch, Hooper Branch, America Branch, Coal Valley Branch, Patton Branch, Corona Branch, Webbs Branch and Percy Branch; A. J. Frazer, Superintendent, Birmingham, Ala. Richmond Division—Neapolis to West Point, Va., Keysville Branch and Henderson Branch; W. T. West, Superintendent, Richmond, Va. Asheville Division—Salisbury, N. C., to Morristown, Tenn., Murphy Branch and Biltmore Yard; W. O. Sprigg, Superintendent, Asheville, N. C. Columbia Division—Charlotte, N. C., to Augusta, Ga , Columbia to Greenville, Alston to Spartanburg, Abbeville Branch and Anderson Branch; P. I. Welles, Superintendent, Columbia, S. C. Macon Division—Atlanta to Brunswick, Ga., Georgia Midland Railway, Hawkinsville Branch and Dock Branch; W. R. Beauprie, Superintendent, Macon, Ga. Anniston Division—Atlanta Junction, Ga., to Meridian, Miss., Birmingham Junction to Mobile Junction, Blocton Branch, Lauderdale Branch and Akron Branch; A. Gordon Jones, Superintendent, Selma, Ala. Knoxville Division—Bristol to Chattanooga, Tenn., Embreeville Branch, Rogersville Branch, Knoxville Belt Railroad, Knoxville, Cumberland Gap & Louisville Railway, Knoxville & Ohio Railroad, Harriman Branch, Briceville Branch, Big Mountain Branch, and New River Branch; F. K. Huger, Superintendent, Knoxville, Tenn. Louisville Division—Louisville to Lexington, Ky., Burgin Branch and Georgetown Branch; G. R. Loyall, Superintendent, Louisville, Ky. The jurisdiction of J. S. B. Thompson, Assistant General Superintendent, Atlanta, Ga., will be over the Atlanta, Macon, Anniston, Birmingham, Knoxville and Louisville divisions. The following assignments of jurisdiction of master mechanics are made: Washington Division, C. F. Thomas, Master Mechanic, Alexandria, Va.; Norfolk and Charlotte divisions, and between Spencer, N. C., and Asheville, N. C., not including Asheville Terminals, W. H. Hudson, Master Mechanic, Spencer, N. C.; Atlanta and Macon divisions, W. L. Tracy, Master Mechanic, Atlanta, Ga.; Birmingham Division, W. A. Stone, Master Mechanic, Birmingham, Ala.; Richmond Division and Danville Terminals, W. H. Owens, Master Mechanic, Manchester, Va.; Columbia Division, T. S. Inge, Master Mechanic, Columbia, S. C.; Anniston Division, T. M. Feeley, Master Mechanic, Selma, Ala.; Knoxville Division, and between Morristown, Tenn., and Asheville, N. C., including Asheville Terminals, and between Asheville, N. C., and Murphy, N. C., J. B. Michael, Master Mechanic, Knoxville, Tenn., and Louisville Division, V. B. Lang, Master Mechanic, Louisville, Ky. The office of General Roadmaster and the office of Superintendent of Bridges and Buildings will be abolished, and the following appointments have been made: J. A. Dodson, Superintendent of Track, Bridges and Buildings, Washington, D. C., in charge of the Maintenance of Way and Structures upon the Washington, Norfolk, Charlotte, Richmond, Asheville and Columbia Divisions, and so much of the Atlanta Division as lies between Greenville, S. C., and Belt Junction, including branches: D. W. Lum, Superintendent of Track, Bridges and Buildings, Atlanta, Ga., in charge of the Maintenance of Way and Structures upon the Atlanta (except between Belt Junction and Greenville, S. C.), Birmingham, Macon, Anniston, Knoxville and Louisville divisions. The following assignments of jurisdiction and appointments have been made: Atlanta Division (except east of Belt Junction), and Birmingham Division between Austell and Woodlawn, J. S. Lemond, Roadmaster and J. W. Lovett, Supervisor of Bridges and Buildings; headquarters, Atlanta, Ga. Birmingham Division (West of Woodlawn), T. W. Evans, Roadmaster and R. W. Hutchings, Supervisor of Bridges and Buildings; headquarters, Birmingham, Ala. Macon Division, R. E. Smith, Roadmaster and J. Guyton, Supervisor of Bridges and Buildings; headquarters, Macon, Ga. Anniston Division, B. B. Arwood, Roadmaster and J. H. Rosseau, Supervisor of Bridges and Buildings; headquarters, Selma, Ala. Knoxville Division, J. E. Platt, Roadmaster and John Anderson, Supervisor of Bridges and Buildings; headquarters, Knoxville, Tenn. Louisville Division, A. L. Buck, Roadmaster and D. E. Hooper, Supervisor of Bridges and Buildings; headquarters, Lawrenceburg, Ky., all reporting to D. W. Lum, Superintendent of Track, Bridges and Buildings; Washington Division, G. W. Payne, Roadmaster, and G. W. Welker, Supervisor of Bridges and Buildings; headquarters, Manassas, Va. Norfolk Division, Thomas Bernard, Roadmaster, and A. A. Wells, Supervisor of Bridges and Buildings; headquarters, Greensboro, N. C. Charlotte Division and Atlanta Division between Greenville, S. C., and Belt Junction, R. Southgate, Roadmaster, and C. R. Walton, Supervisor of Bridges and Buildings; headquarters, Charlotte, N. C. Richmond Division, L. J. Carmalt, Roadmaster, and Burton Marye, Supervisor of Bridges and Buildings; headquarters, Richmond, Va. Asheville Division, H. L. Coe, Roadmaster, and W. R. Woodard, Supervisor of Bridges and Buildings; headquarters at Asheville, N. C., and Columbia Division, G. W. Bartlett, Roadmaster, and J. W. Morgan, Super-

visor of Bridges and Buildings; headquarters at Columbia, S. C., all reporting to J. A. Dodson, Superintendent of Track, Bridges and Buildings. These appointments all take effect July 4.

RAILROAD CONSTRUCTION,
Incorporations, Surveys, Etc.

Aberdeen & Rock Fish.—An extension of this North Carolina road is proposed from its present terminus at Endon, east about eight miles in the direction of Fayetteville, to Hope Mills. The road now extends from Aberdeen east 13 miles to Endon; it was originally projected to connect Aberdeen with Fayetteville. John Blue, Aberdeen, N. C., is President and General Manager.

Baltimore & Ohio.—Plans have been prepared for improving that portion of the line known as "Falls Cut," 22 miles west of Cumberland, Md., on the mountain grade. This cut has become dangerous through sliding of the earth and stones, and is to be replaced by a tunnel 530 ft. long, which will involve 20,000 cu. yds. of excavation. Three new steel bridges will also be built, one to be 80 ft. and the other two 60 ft. long. About one mile of the line will be affected by these changes and two curves will be eliminated. It is expected that the work will be finished this year.

Chicago, Indiana & Eastern.—Surveys have recently been made for an extension of this road from Fairmount, Ind., northwest to Converse. Nearly all of the right of way has been obtained and it is stated that contracts have already been let for the new line. The road, which was originally projected from Converse southwest 79 miles to Richmond, Ind., has been finished between Fairmount and Matthews, 10 miles, and has been graded for an additional 15 miles from Matthews to Muncie. It is now expected that the line will be finished to Converse by Nov. 1.

Coro & La Vela.—General Jacob Baiz, President, states that this road in Venezuela, S. A., was opened for traffic July 1. The company was incorporated in New Jersey last year with a capital stock of $500,000. The road extends from Coro to the port of La Vela, in the northwestern part of Venezuela, a distance of nine miles. All material used in building and equipping the road was bought in the United States.

Delaware Valley, Hudson & Lehigh.—This company was incorporated in Pennsylvania on June 24 with a capital stock of $825,000. The incorporators and first Board of Directors are: J. B Lung, Brooklyn, N. Y., President; Miles G. Shoemaker, Rush, Pa.; M. F. Coolbaugh, Pa; Edwin F. Peters, Bushkill, Pa., and J. Kellow, Pen Argyle, Pa. It is proposed to build a railroad from Wind Gap, Northampton County, Pa., in a general northeasterly direction 50 miles to Matamoras, Pa., via Saylorsburg Stroudsburg and Bushkill. The office of the company is at Stroudsburg, Pa.

Dooly Southern.—This company has recently been incorporated to build a railroad from Richmond, Dooly County, Ga., southeast 35 miles, through Dooly County to Irwinville. The capital stock is $50,000. The incorporators are: George W. Parrott, I. X. Chenes, George W. Parrott, Jr., W. S. Thomson, Jacob Haas, B. P. O'Neal, William Scaudrett, W. B. O'Neal, J. T. West and T. A. Scott.

Hawkinsville & Florida Southern.—Surveys have been made for an extension of this road from its present northern terminus at Pitts, Ga., north about 26 miles to Hawkinsville, Ga. The road now extends from Worth, Ga., to Pitts, via Davisville, a distance of 21 miles, and a branch line is being built from Davisville southeast to Fitzgerald, of which five miles have been finished. J. W. Pope, Atlanta, Ga., is President of the company.

Kansas City, Pittsburgh & Gulf.—Tracklaying has been completed to Lake Charles, La., and the company recently announced its intention to begin regular train service between Kansas City and Port Arthur on July 1, using the tracks of the Southern Pacific between Lake Charles and Beaumont, Tex., until its own line is completed, which is expected to be in about 30 days. Tracklaying on the main line has reached De Quincy, 720 miles south of Kansas City, and 47 miles north of Beaumont, and the bridge over the Sabine River is nearly completed.

Omaha, Kansas City & Eastern.—This company has completed the link between Pattonsburg and Trenton, Mo., 35 miles, which connects the Omaha & St. Louis with the Quincy, Omaha & Kansas City. This forms a through line from Omaha to Quincy, Ill., 315 miles. The Quincy, Omaha & Kansas City and the Omaha & St. Louis will shortly be turned over to this company, to be operated as one line. The Omaha, Kansas City & Eastern has recently filed a mortgage of $14,000,000 to Walter G. Oakman and George R. Trumbull as trustees for the Guaranty Trust Co., of New York. This will form a first mortgages on the entire line from Omaha to Quincy.

Pittsburgh, Bessemer & Lake Erie.— Contracts have recently been given to the Drake & Stratton Co. and the T. A. Gillespie Co., both of Pittsburgh, Pa., for the last of the heavy work to be done on the line. The work is to be finished within four months. The Drake & Stratton Co.'s contract includes a rock cut about 4,000 ft. long, and about 500,000 cu. yds. of excavation on the Union Railway, a branch line to connect the Duquesne, Braddock and Homestead works of the Carnegie Steel Co. This cut, which will average about 25 ft. in depth, will begin at the south end of the new bridge across the Monongahela, which is now being built by the Drake & Stratton Co., at a point about opposite the Edgar Thomson Steel Works. Work has already been begun on this cut, and about 500 men are being employed. The contract given to the T. A. Gillespie Co. is for work on the north side of the Monongahela River at Port Perry, and includes a rock cut which will necessitate about 35,000 cu. yds. of excavation. The contract held by C. I. McDonald & Co., of Pittsburgh, for 30 miles of grading and excavation between the Allegheny River and Butler, Pa., is nearly completed and rails have been laid from Butler, about half the distance to the Allegheny River. The bridge over the Allegheny at Denny station, and the Nixon cut, are both nearly finished. Rogers, Farrell & Hegeman, of New York City, contractors for the work between the Allegheny and Monongahela Rivers, have about half finished the cut north of Butler on the old Pittsburgh, Shenango & Lake Erie at Euclid. This cut is through a hard rock, which necessitates constant blasting. A large force of men is now at work grading the new yards at Albion, which will cover about 80 acres. A small roundhouse will be built at this ploce.

Pittsburgh, Connellsville & Baltimore.—This road was incorporated in Pennsylvania, June 29, with a capital stock of $150,000. The company will be managed by a president and board of six directors, the names being given in another column. It is proposed to build a road 14 miles long in Fayette County, Pa., from a point in German Township to a point in Springhill Township.

Pochuck.—The New York Railroad Commissioners have granted the application of this company for permission to build its proposed line in Orange County, N. Y., from the quarries of the Empire Granite Co., at Pochuck Mountain, north about 3½ miles to a point on the Lehigh & New England Railroad, between Liberty Corners and Wilcox, N. Y. The company was incorporated at Albany, N. Y., last April with a capital stock of $20.000.

Rio Grande, Sierra Madre & Pacific.—This road, which has been finished from Cuidad Juarez, opposite El Paso, Tex., 157 miles southwest to Casas Grandes, has been accepted by the Mexican government, and the first through train was run over the line on June 24. From El Paso the line runs west as far as Lake Guzman, thence southwesterly, touching the Sabinal mining country, San Pedro and Corralitos. The road is standard gage and is laid with Carnegie 60-lb. rails, the ties being of Texas pitch pine. The work of building began October 1, 1896. The subvention from the federal government is $8,000 per kilometer. The company is organized under the laws of the state of New York and the road has been built by New York capitalists, among whom are A. Foster Higgins, E. D. Morgan, Estate of George Bliss, John T. Terry, Solon Humphreys and A. G. Agnew.

Sierra, (Cal).—T. S. Bullock, one of the promoters of this new line in California, states that grading has been finished to a point eight miles beyond Cooperstown, to which place the road is now running. A trestle is being built across the mouth of Quigley Cañon, and just beyond that point considerable heavy rock work will be encountered. It is expected that the work will be finished as far as Sonora some time during October. The road is projected from Oakdale to Sonora, with a branch from Sonora north to Angel's Camp and other mining towns, and another branch from Chinese Camp south to Coulterville, Mariposa County.

Springfield, Little Rock & Gulf.—It is reported that work will shortly be begun on this proposed road (recently referred to in these columns as the Springfield, Harrison & Gulf). The Smith bill, which provides for a grant to the company of 1,000 acres of the Arkansas state lands per mile for each mile of main line built in that state, said lands being limited to counties lying within 50 miles of the railroad, has been passed by the Arkansas legislature. The road is projected from Springfield, Mo., south through Dardenelle and Little Rock, Ark., to Alexandria, La., with branches both east and west from Dardenelle. Bids have already been received for 85 miles of the line in Missouri, and it is stated that surveys are now been made for the line in Arkansas. The officers of the company are: John A. Hinsey, of Chicago, President; John B. Jones, Little Rock, Ark., Secretary, and J. S. Bouslog, Springfield, Mo., Treasurer. The terms of the Smith bill provide that work of building the road must be commenced within six months.

Toledo & Milwaukee.—This company filed articles of association in Michigan June 22. The capital stock is $1,500,000, and among the incorporators are persons identified with the Detroit & Lima Northern. It is proposed to build a railroad from a point on the boundary line between Ohio and Michigan in a general northwesterly direction through Southern Michigan, about 170 miles, to Holland, a point on Lake Michigan. The new line will be practically an extension of the Detroit & Lima Northern.

Electric Railroad Construction.

Baltimore, Md.—The Baltimore Consolidated Railway Co. has given to Messrs. David E. Evans & Co. the contract for a new line of about 1,700 ft. of double track on Paca street, from Fayette street to Columbia avenue, connecting the Fayette street and Druid Hill avenue lines with the Columbia avenue and Westport lines.

Since the consolidation of the electric roads of Baltimore, as noted last week, the President of the new company has announced that the second transfer privilege will be withdrawn and that the sale of six tickets for a quarter will be discontinued.

Beaumont, Tex.—The Beaumont Electric Railroad Co. has applied for a 50-year franchise for building an electric road, work on which is to begin within six months and to be completed in two years.

Biddeford, Me.—Articles of association have been filed with the Maine Railroad Commissioners for an electric road, beginning at this place and running through Saco and Buxton to Bonny Eagle, in the town of Standish, the total length being about 20 miles. The directors are Charles S. Hamilton and William A. Roberts, of Biddeford, and James Bradbury Oliver, of Boston. The capital is $250,000.

Boston, Mass.—On petition, the charter of the Millbury, Sutton & Douglas Railroad has been revived, the road to operate by electricity, but to be subject to the rights and privileges of a steam road. Its capital cannot exceed $200,000, and it can run in the highways. Construction must begin within a year.

Bridgewater, Mass.—The Bridgewater, Abington & Whitman Street Railway Co. has been incorporated in Massachusetts with a capital of $35,000. The principal stockholders are Frederick C. Hinds, of Newtonville, and George J. Morse, of Hyde Park. Charles H. Wilson, of Boston, is Treasurer. The line of the proposed road is from a point near the Old Colony Station in Bridgewater northeast through East Bridgewater, Whitman and Abington to Rockland, a distance of about 10 miles

Brooklyn, N. Y.—The DeKalb Avenue & North Beach Railroad Co. was incorporated June 24, with a capital of $200,000. The company will be controlled by the Brooklyn City & Newtown Railroad Co., and the Directors of the latter road also control the interests of the DeKalb Avenue & North Beach Railroad.

The Brooklyn City & Newtown Railroad Co. has filed a certificate for an extension of its present road over DeKalb and Wyckoff avenues to Newtown, including two branches along Dry Harbor road to Metropolitan and Myrtle avenues.

Camden, N. J.—The extension from Collingswood to Haddonfield, by the Camden & Suburban Railway Co., will soon be built.

Chicago, Ill.—At a meeting of the Directors of the South Side Elevated Railroad Co., it was decided to issue $750,000 of bonds, and the money realized on their sale, together with the cash on hand and the reserve fund of $100,000, be applied to change the motive power of the Alley L road to electricity. The bonds to be issued have already been sold to the Illinois Trust & Saving Bank, and it is understood that the bonds will be offered to the public at par. The present issue is made up of 4½ per cent. 20-year bonds.

Columbus, O.—The Richland Railway Co., of Mansfield, was incorporated June 22 by Charles W. French, A. W. French, L. Walker, V. A. Delind and C. H. Workman. They will build a railroad to be operated by steam or electricity between Mansfield and Shelby. Capital stock, $10,000.

Crescent Springs, Ky.—The Crescent Springs & Erlanger Electric Street Railway Co. has filed articles of incorporation, with a capital stock of $10,000, to build a line from Ludlow through Bromley and Crescent Springs to Erlanger, a distance of seven miles.

Easton, Pa.—The Northampton Electric Railway Co., capital $300,000, was chartered at Harrisburg June 28 to build a line, 12 miles long, from Fourth and Northampton streets, this city, through a number of streets and out the Bethlehem road to Bethlehem and for some distance over the Freemansburg Road. The directors are James Kerr, Clearfield, Pa., President; Geo. S. Wood, Lock Haven; J. Frank Snyder, A. O. Smith and G. S. Hughes, all of Clearfield.

Greenbush, N. Y.—The Greenbush & Nassau Electric Railroad has been granted the necessary rights in order to build its road from Greenbush southeast to Nassau. The present route passes Nassau Lake and is about 20 miles in length. The work of building will begin very soon and is expected to be finished by October next.

Greenville, O.—The Greenville Council has granted a franchise to the Cleveland, Painesville & Eastern Railroad to lay tracks for the finishing of its line. One condition of the franchise is that the cars shall be running by Dec. 1, 1897.

Meadville, Pa.—Isaac Walker & Son, of Philadelphia, have been awarded the contract for a power house for the Meadville Electric Co., at a total cost of about $80,000.

Morgantown, N. C.—F. K. Bruner, of Raleigh, N. C., and others are making arrangements to build an electric railroad from Morgantown to Blowing Rock, N. C., a summer resort. The road will connect at Morgantown with the Southern Railway, which is also reported to be interested financially in the enterprise. The total length of the track will be over 35 miles and some difficult engineering work will probably have to be done in order to complete the road over the mountains.

Newton, Mass.—The Railroad Commissioners have authorized an issue of $75,000 of stock instead of $100,000 asked for by the company. About three months ago the Commissioners gave the company permission to extend the road to Needham.

Saratoga, N. Y.—The Saratoga Northern Railway, was incorporated at Albany, June 28, with a capital of $1,000,000. The company will build a standard-gage road to be operated by electricity from Saratoga Springs to Wilton and to Mt. McGregor, a distance of 11 miles. The Directors are C. E. Arnold, H. McGonegal, L. C. Jordan, New York City; J. B. Hampton, Philadelphia; A. C. Kaufman, H. H. Schaff, Edward R. Manice, Pittsfield; J. B. Robertson, New Haven, Conn., and A. J. Voyer, Albany. This company is formed for the purpose of acquiring the property and francises of the Mt. McGregor Railroad and of the Saratoga and Mt. McGregor Railroad. The Mt. McGregor is a narrow-gage road, and has a charter authorizing the building of a road from Saratoga to Lake George.

Scranton, Pa.—A survey has been made by which the Scranton Street Railway Co. will be able to run an unbroken track from Hyde Park to Providence. The plan is to run a track westward from Main avenue about 300 ft., and then cross the D., L. & W. Railroad by a bridge which will be built. Thence over a private right of way to Maine avenue again at a point about 500 ft. north of the railroad tracks.

Southbridge, Mass.—Nearly $20,000 has been subscribed for an electric road to be built from Carlton to Southbridge, a distance of 7½ miles. The company will not be organized until the full amount, $50,000, is raised.

Wellesley, Mass.—The Railroad Commissioners of Massachusetts have approved the application of the company to increase its capital stock from $40,000 to $100,000. An extension of the road is contemplated.

Williamsport, Pa.—The Montoursville Passenger Railway Co., capital $75,000, was chartered at Harrisburg June 28 to build a 5-mile line from this city to Montoursville over the Montoursville road. The directors are: Wm. V. Massey, Eddington, Pa., President; M. R. Massey, Eddington; Chas. F. Trego and Wm. H. Hassenplug, Philadelphia, and Harry M. Van Zant, Harrisburg.

GENERAL RAILROAD NEWS

Annapolis, Washington & Baltimore.—An agreement has been made for consolidating this road with the Baltimore & Annapolis Short Line, and it is understood that in future the two lines will be operated jointly. The Baltimore & Annapolis Short Line extends from Baltimore southeast to Bay Ridge, Md., via Annapolis, 33 miles, connecting with the Baltimore & Ohio at Baltimore. The Annapolis, Washington & Baltimore extends from a connection with the Baltimore & Ohio at Annapolis Junction southeast, 20 miles to Annapolis, where it connects with the Short Line.

Boston Elevated.—Within a few days the company will apply to the Massachusetts Railroad Commissioners for authority to issue capital stock, which by the terms of its charter is to be not less than $10,000,000 or more than $20,000,000. The entire issue of stock has been underwritten by a syndicate which includes J. P. Morgan & Co., and Kidder, Peabody & Co. The syndicate stands ready to take the stock in case it is not readily disposed of as a public investment. Plans and preliminary surveys for the first route have been made, and as soon as the issue of stock is authorized by the Commissioners the company will apply for a lease of the West End Street Railway, the lease and property secured by it being applicable as security for the bonds of the company.

Canadian Pacific.—The earnings for May and for the five months ended May 31 have been reported as follows:

	1897.	1896.	Inc. or Dec.
May:			
Gross earn	$1,930,295	$1,724,869	I. $255,426
Oper. expen	1,104,725	1,037,379	I. 67,346
Net earn	$875,570	$687,490	I. $188,080
Five months:			
Gross earn	$7,712,117	$8,484,432	D. $772,315
Oper. expen	4,928,051	5,999,499	D. 1,071,448
Net earn	$2,784,066	$2,484,933	I. $299,133

Central of New Jersey.—The earnings for May and for the five months ended May 31 have been reported as follows:

	1897.	1896.	Inc. or Dec.	
May.				
Gross earn	$966,375	$978,383	D.	$12,008
Oper. expen	635,229	674,427	D.	39,198
Net earn	$341,146	$313,956	I.	$27,190
Five months:				
Gross earn	$4,509,513	$4,701,356	D.	$200,843
Oper. expen	3,065,448	3,237,466	D.	172,018
Net earn	$1,435,065	$1,463,890	D.	$28,825

Chicago & Northwestern.—The preliminary report of the company's earnings for the year ended May 31 is as follows:

	1897.	1896.	Inc. or Dec.	
Gross earn	$30,977,242	$33,488,761	D.	$2,511,518
Oper. expen	26 623,413	28,378,588	D.	1,755,175
Net earn	$4,353,830	$5,110,173	D.	$756,343
Other income	336,799	257,969	I.	78,881
Total net	$4,690,629	$5 368,082	D.	$677,462
Dividends	3,518,650	3,517,058	I.	1,592
Surplus	$1,171,970	$1,851,024	D.	$679,054

Chicago, Burlington & Quincy.—The earnings for May and for the five months ended May 31 have been reported as follows:

	1897.	1896.	Inc. or Dec.	
May:				
Gross earn	$2,806,062	$2,451,619	I.	$354,443
Oper. expen	1,967,599	1,822,465	I.	144,934
Net earn	$838,663	$629,154	I.	$209,509
Fixed charges	290,000	881,107	I.	8 893
Deficit	$51,337	$.51,953	D.	$200,616
Five month :				
Gross earn	$13 919,715	$12,867,540	I.	$1,052,175
Oper. expen	8,532,381	8,677,681	D.	85,300
Net earn	$5,327,334	$4,189,859	I.	$1,137,475
Fixed charges	4,450,000	4,405,536	I.	44,464
Surplus	$877,334	(def.) $215,677	I.	$1,093,011

Chicago Terminal Transfer Co.—The $5,000,000 of certificates of proprietary interest in the securities of this company, which were to be received by the Northern Pacific under the plan of reorganization of the Chicago & Northern Pacific, have been sold by the Northern Pacific to the foreign and domestic interests which have heretofore been the principal owners of the Chicago & Northern Pacific bonds. By the sale the Northern Pacific has, in accordance with the purpose announced in its plan of reorganization, disposed of its entire interest in this property.

Fonda, Johnstown & Gloversville.—The stockholders of the company have authorized a refunding mortgage amounting to $700,000, bearing 4½ per cent., to retire the present 6 and 7 per cent. bonds outstanding against the road. At a meeting of the Board of Directors held recently at Gloversville, N. Y., resolutions were passed for issuing this mortgage. A contract was made some time ago with E. C. Jones & Co., of New York, by which the latter has control of the new bonds and of the refunding plan. The road extends from Fonda, N. Y., to Northville, 26 miles, connecting with the New York Central & Hudson River at Fonda.

Kansas Central.—This road was sold at auction under foreclosure at Leavenworth, Kan., on June 25, by Master in Chancery Hiram P. Dillon, of Topeka, Kan., and bought by Walter B. Horne and Thomas Joyce, of Brooklyn, N. Y., who were represented by P. C. Anderson, of New York, for $200,000, the lowest bid that could be accepted under the order of sale. The road, which was opened in 1877, extends from Leavenworth to Miltonvale, Kan., 165 miles, and has been in the hands of receivers since Oct. 13, 1893.

Lake Shore & Michigan Southern.—The earnings for the six months ended June 30 have been reported as follows (estimated for 1897):

	1897.	1896.	Inc. or Dec.	
Gross earn	$9,619,244	$10,125,829	D.	506,685
Oper. expen	6,445,175	6,9.9,247	D.	464,072
Net earn	$3,174,039	$3,196,632	D.	$22,613
Charges	1,680,000	1,680,000		
Balance	$1,494,059	$1,516,652	D.	$22,613
Dividends	1,483,995	1,483,935		
Surplus	$10,044	$32,657	D.	$22 613

New York & Harlem.—In the adjustment of the relations between this company and the New York Central & Hudson River, incident to the general refunding scheme now under way, suit has been brought against this company by the New York Central to compel it to execute a mortgage on its property and franchises to the latter company and to issue bonds under the mortgage for $12,000,000 payable May 1, 2000. The question to be decided by the suit is practically whether the stockholders of this company or of the New York Central shall benefit by the refunding at 3½ per cent. of the present 7 per cent. $12,000,000 mortgage, the saving in interest by this operation being $420,000 a year. The company recently decided to issue a new mortgage to the Guaranty Trust Co., to take up the maturing bonds, and this action the New York Central seeks to enjoin asking for an injunction restraining this company from making and issuing such mortgage to the Guaranty Trust Co., or to any other person or corporation without the consent of the New York Central. The plaintiff sueh for the right to pay and discharge the present outstanding mortgage of this company.

Philadelphia & Reading.—The earnings for May and for the six months ended May 31 were as follows:

	1897.	1896.	Inc. or Dec.	
May:				
Gross earn	$1,613,102	$1,649 758	D.	$36,6 6
Oper. expen	1,024,841	1,001,499	I.	23 742
Net earn	$588,261	$648,639	D.	$60,398
Six Months:				
Gross earn	$9,459,143	$9,876,414	D.	$417,271
Oper. expen	5,546,879	5,892,293	D.	345,414
Net earn	$3,912,264	$3,984,121	D.	$71,857

Southern.—The earnings for May, and for the eleven months ended May 31, were as follows:

	1897.	1896.	Inc. or Dec.	
May:				
Gross earn	$1,474 518	$1,364,675	I.	$1 9,843
Oper. expen	1,161,627	1,121,393	I.	36,234
Net earn	$313,891	$240,282	I.	$73,609
Eleven months:				
Gross earn	$17,646,565	$17,885,641	D.	$237,076
Oper. expen	12,195,299	12,452,565	D.	34 ,266
Net earn	$5,511,266	$5,131,076	I.	$110,190

Southern Pacific.—The earnings of the entire system for May and for the 11 months ended May 31 have been reported as follows:

	1897	1895.	Inc. or Dec.	
May:				
Gross earn	$3,807,068	$3 542 025	I.	$265 043
Oper. expen	2,611,015	2,637.404	D.	26,389
Net earn	$1,193,053	$904,621	I.	$291,432
Eleven months:				
Gross earn	$45,102.385	$46,022,101	D.	$919,716
Oper. expen	29,021,491	30.154,702	D.	1,133,301
Net earn	$16,080,984	$15,867,399	I.	$213,585

South Side Elevated (Chicago).—At a meeting of the stockholders, held in Chicago on June 24, the proposed issue of $1,500,000 of 4 per cent. 10-year bonds, referred to in these columns on May 7, was authorized. These bonds will be guaranteed by a mortgage on the entire property of the company. One-half of the issue ($750,000) has been sold to the Illinois Trust & Savings Bank, and the proceeds will be used for providing electrical equipment for the road. The remainder of the bonds will be held in the treasury against future extensions and improvements.

Tennessee Central.—The Tennessee Central Railroad was sold under foreclosure at Crossville, Tenn., June 24, and bought by Col. Jere Baxter, representing a syndicate of St. Louis capitalists, for $125,000. The sale was confirmed by Judge Smith at Crossville the day following. We understand that arrangements are now being made to finish building the road, which is projected from the terminus of the Nashville & Knoxville, near Monterey, Tenn., east via Crossville, Rockwood and Harriman, to Knoxville, a distance of about 92 miles. The road has already been graded between Monterey and Crossville, 21 miles, and on 10 more miles on another part of the road. Two-thirds of the heavy tunneling work has also been finished. The route, as planned, passes through Cumberland County, which abounds in a fine quality of coking coal. The new company will be known as the Tennessee Central Railway.

Union Pacific.—The Reorganization Committee, composed of Louis Fitzgerald, Jacob H. Schiff, T. Jefferson Coolidge, Jr., Chauncey M. Depew, Marvin Hughitt and Oliver Ames, has declared operative its plan of reorganization dated Oct. 15, 1895, with the modifications subsequently published. This action of the committee was made necessary by the fact that the time within which the plan could be made operative expired on May 30, being 18 months from the time when it was first published. The new plan is said to provide for the securing of the road by the Reorganization Committee for the actual net sum of $28,691,336, although the minimum bid was fixed at $45,754,000. The difference is made up from deductions on account of sinking funds, etc. The allotment of first mortgage 4 per cent. bonds, which under the original plan was to be $100,000,000, is to be reduced under the modified plan to $75,000,000, and there is to be an increase in the allotment of preferred stock. The Reorganization Committee has now secured nearly all of the outstanding bonds and stock. The time for the actual sale of the road to the new company under the foreclosure proceedings was set for the first week in July, but owing to necessary legal formalities it is not expected that it will take place before October next. The Oregon Short Line has been reorganized on its own account since the original plan for reorganization was drawn up, and the Kansas City & Omaha and the St. Joseph & Grand Island, being separately organized, will pass out of the system. Jacob H. Schiff, of the Reorganization Committee, states that all arrangements in regard to the foreclosure have been completed, and that the referee will report to the Court early in July that the day of sale is expected to be named by the Court as soon as the report is received.

Utah Central.—This road has been bought from the New York bondholders by the Rio Grande Western, the amount paid being reported as about $325,000. At the foreclosure sale on May 8 the property was bought in by Graff & Dittmeyer, representing the New York bondholders, for $277,000. The road is narrow gage and extends from Salt Lake City to Park City, Utah, 32 miles, with branches from Park City eastward seven miles and from Salt Lake City six miles.

Visalia.—The formal transfer of this road to the Southern Pacific was made on June 19, Division Superintendent D. Burkhalter, of the latter company, taking charge of the property. The road extends from Visalia, Cal., to Goshen, Cal., 7.3 miles, and is standard gage. It was opened in September, 1874, and has since been operated by local capitalists. It is expected that the road will be extended 10 or 12 miles east to a connection with the Southern Pacific.

Wabash.—The earnings for May and for the 11 months ended May 31 have been reported as follows:

	1897.	1896.	Inc. or Dec	
May:				
Gross earn	$931,177	$965,146	D.	$33,969
Oper. expen	633,233	758,484	D.	122,251
Net earn	$294,944	$206,662	I.	$88,282
Eleven months:				
Gross earn	$10,577 845	$11.827,586	D.	$1,249.741
Oper. expen	7,327,379	8,467,914	D.	1,140,535
Net earn	$3,250,466	$3,359,672	D.	$109,206

Wheeling & Lake Erie.—At the request of the holders of a majority of the first mortgage (Lake Erie Division) gold bonds of the company, due Oct. 1, 1926, George Coppell, Edward N. Gibbs, Frederick Cromwell and Joel B. Erhardt have consented to act as a committee for the protection of the common interests of such of the bondholders as shall deposit their bonds under an agreement with the Guaranty Trust Co., of New York.

Electric Railroad News.

Brooklyn, N. Y.—The Brooklyn Elevated Railroad has obtained an injunction restraining the Nassau Electric Railroad from carrying passengers to Coney Island for five cents over the South Brooklyn route. The Appellate Division of the Supreme Court handed down a decision requiring the Nassau Railroad to give $10.000 security for staying the injunction.

Holyoke, Mass.—The State Railroad Commissioners have authorized an original issue of $100,000 of stock for the Mt. Tom electric railroad.

Milwaukee, Wis.—The Milwaukee & Wauwatosa Electric Railway was sold at auction June 26 for $43,500. It was bought by C. F. Rosenkrantz. In the building and equipment of the line $306,000 was expended.

New York.—The Metropolitan Street Railway Co. on June 29 secured the right to run its cars over the branch of the Union Railway Co., which runs through 135th street from Eighth avenue to the Madison avenue bridge, by leasing this line for 99 years. At present the branch is operated by an overhead trolley, but it is said that the Metropolitan Company will change to the conduit method in order that a perfect loop may be formed with the electric roads it is proposed to establish upon Madison, Lenox and Eighth avenues.

Pittsburgh, Pa.—Judge J. W. F. White in a decree in the case of the Fidelity Title & Trust Co. against the McKeesport, Duquesne & Wilmerding Railway holds that the Fidelity Title & Trust Co., as Receiver, has the right to sell the property of the railroad, and continues the receivership until further orders from the Court.

Savannah, Ga.—The Savannah, Thunderbolt & Isle of Hope Railway Co. was recently consolidated with the Savannah Traction Co., and has chosen the following officers: President, J. H. Johnson; Vice-President, Henry Parsons; Treasurer, Edward J. Thomas, Jr.; Secretary, Edward J. Thomas, Sr., and Auditor and Accountant, Thomas J. Reid. The capital stock of the company will be increased.

TRAFFIC.

Traffic Notes.

The railroads centering in Louisville have finally agreed to re-establish the Louisville Car Service Association, which was disbanded a year and a half ago because of disagreement about special allowances for pig iron. It is said that the Association will begin operations Aug. 1, and that Mr. J. C. Loomis will again be the Manager.

Not only Philadelphia, but Baltimore and Chicago, and probably every important city anywhere near the lines of the Joint Traffic Association, is now demanding that whatever favors are granted to New York City in the way of merchants' excursions shall also be granted to the complainants.

On July 1 the express business of the Houston, East & West Texas road was taken over by Wells, Fargo & Co. This change will result in the extinction of the Texas Express Co., which was formed before the war, and at one time did nearly, or quite, all the railroad express business in that state.

The $10 rate between San Francisco and Portland over the Southern Pacific Railroad is now available on passenger trains every day instead of only on a special train run once a week to compete with the steamers. The Pacific Coast Steamship Co. has reduced the first-class fare from San Francisco to Puget Sound ports to $8 and the second class to $4, both rates including berths and meals.

The Managers of the Joint Traffic Association have again postponed the date for the abrogation of all commodity rates. The time set was June 30, but the examination of a large number of applications for new commodity rates requires so much time that the old rates are continued to Sept. 30. Rates on cotton, live stock, dressed meats and certain other commodities, are not included in the present order.

The Railroad Commissioners of Texas have promulgated a reduced express tariff for certain commodities carried by the express companies. It appears that the rates for valuables and for ordinary merchandise were not changed, the principal commodities affected being fruit and other perishable goods. An officer of one of the express companies tells a reporter that most of the business in these commodities is interstate.

The Lake Michigan Car Ferry Line has made arrangements to run its floats to and from St. Joseph and Benton Harbor, Mich., to a connection with the Cleveland, Cincinnati, Chicago & St. Louis, and the Vandalia. It is hoped to get a considerable traffic in fruit. It is reported that the Wisconsin & Michigan Railroad has disposed of its interest in the ferry line, and that the Big Four has bought it. It is said that the Big Four will run the floats between Benton Harbor and Manitowoc, Wis. An officer of the Wisconsin & Michigan road has denied this report, but the tenor of the different accounts would seem to indicate that it has some basis of truth.

Chicago Traffic Matters.

CHICAGO, June 30, 1897.

Conditions continue chaotic in the freight world, the attempts to restore rates to a firm basis seemingly having no effect whatever. The Chicago Great Western road some days ago made a rate on corn from Kansas City to Chicago of 9¼ cents per 100 lbs. It also made a 7-cent rate from the Mississippi River. The Missouri Pacific, which carries grain to St. Louis, now states that it will reduce its corn rate from 1 to 3 cents from Kansas and Nebraska points to Mississippi River points, and will maintain a difference of 5 cents between the Mississippi Rate and the Chicago rate. The Iowa Central has also been aroused and has given notice of a reduction in corn rates from all points on its line to Peoria of 2½ cents, and declares that hereafter it will make the same rates to Peoria as to the Mississippi River.

Acting under a ruling made by Chairman Caldwell, of the Western Passenger Association, the Western railroads are refusing to issue half-rate tickets to religious workers, and are now only giving them to ordained clergymen.

Eastbound shipments from Chicago and Chicago junctions to points at and beyond the Western termini of the trunk lines for the week ending June 24 amounted to 56,556 tons, as compared with 55,994 tons the preceding week.

This statement includes 15,380 tons of grain, 2,907 tons of flour and 13,977 tons of provisions, but not live stock. The following is the statement in detail for the two weeks:

Roads.	Week Ending June 24.		Week Ending June 17.	
	Tons.	p. c.	Tons.	p. c.
Baltimore & Ohio	4,803	8 5	4,807	8 6
C., C., C. & St. Louis	2,373	4 2	2,608	4 7
Erie	7,295	12.9	7,584	13.6
Grand Trunk	6,120	10 8	7,285	13.
L. S. & M. S.	3,870	6.9	4,108	7 3
Michigan Central	4,717	8 3	5,889	10 5
N. Y., Chi. & St. L.	4,916	8.7	4,827	8.6
Pitts., Cin., Chi. & St. Louis.	7,322	12 9	5,650	10.1
Pitts., Ft. Wayne & Chicago	10,318	18 3	8,918	15 9
Wabash	4,822	8.5	4,318	7.7
Totals	56,556	100.0	55,994	100.0

Lake shipments last week were 70,499 tons.